

# **SUMMARY OF THE 2002 U.S. NORTH AND SOUTH PACIFIC ALBACORE TROLL FISHERIES**

John Childers  
Southwest Fisheries Science Center  
National Marine Fisheries Service, NOAA  
La Jolla, CA 92037

**2003**

**ADMINISTRATIVE REPORT LJ-03-09**

## TABLE OF CONTENTS

INTRODUCTION .....	4
DATA COLLECTED .....	5
TOTAL CATCH AND EFFORT .....	6
DISTRIBUTION OF CATCHES AND SSTs .....	6
CATCH-PER-UNIT EFFORT.....	7
LOGBOOK SAMPLING COVERAGE.....	9
LENGTH-FREQUENCIES .....	9
LENGTH-FREQUENCY SAMPLING COVERAGE.....	9
SUMMARY .....	10
ACKNOWLEDGMENTS .....	10
LITERATURE CITED .....	11

## LIST OF TABLES

Table 1. North Pacific albacore catches (in metric tons) by fisheries, 1952-2002 .....	13
Table 2. South Pacific albacore catches (in metric tons) by fisheries, 1952-2002.....	15
Table 3. Fishery statistics for the U.S. North Pacific albacore troll fishery .....	17
Table 4. Fishery statistics for the U.S. South Pacific albacore troll fishery .....	17

## LIST OF FIGURES

Figure 1. Distribution of albacore catches by U.S. troll vessels in the 2002 North Pacific season .....	18
Figure 2a. Distribution of albacore catches and sea surface temperatures in May 2002 .....	19
Figure 2b. Distribution of albacore catches and sea surface temperatures in June 2002 .....	20
Figure 2c. Distribution of albacore catches and sea surface temperatures in July 2002 .....	21
Figure 2d. Distribution of albacore catches and sea surface temperatures in August 2002 .....	22
Figure 2e. Distribution of albacore catches and sea surface temperatures in September 2002 .....	23
Figure 2f. Distribution of albacore catches and sea surface temperatures in October 2002 .....	24
Figure 2g. Distribution of albacore catches and sea surface temperatures in November 2002 .....	25
Figure 3a. Distribution of albacore catches by U.S. troll vessels in the 2001-2002 South Pacific season .....	26
Figure 3b. Distribution of albacore catches by U.S. troll vessels in December 2001 .....	27
Figure 3c. Distribution of albacore catches by U.S. troll vessels in January 2002.....	28
Figure 3d. Distribution of albacore catches by U.S. troll vessels in February 2002.....	29
Figure 3e. Distribution of albacore catches by U.S. troll vessels in March 2002 .....	30
Figure 3f. Distribution of albacore catches by U.S. troll vessels in April 2002 .....	31
Figure 4. North and South Pacific albacore CPUEs by U.S. troll vessels from 1961 through 2002 .....	32

Figure 5a. Distribution of albacore CPUEs by U.S. troll vessels in the 2002 North Pacific season.....	33
Figure 5b. Distribution of albacore CPUEs by U.S. troll vessels in May 2002 .....	34
Figure 5c. Distribution of albacore CPUEs by U.S. troll vessels in June 2002 .....	35
Figure 5d. Distribution of albacore CPUEs by U.S. troll vessels in July 2002 .....	36
Figure 5e. Distribution of albacore CPUEs by U.S. troll vessels in August 2002 .....	37
Figure 5f. Distribution of albacore CPUEs by U.S. troll vessels in September 2002 .....	38
Figure 5g. Distribution of albacore CPUEs by U.S. troll vessels in October 2002 .....	39
Figure 5h. Distribution of albacore CPUEs by U.S. troll vessels in November 2002 .....	40
Figure 6a. Distribution of albacore CPUEs by U.S. troll vessels in the 2001-2002 South Pacific season .....	41
Figure 6b. Distribution of albacore CPUEs by U.S. troll vessels in December 2001 .....	42
Figure 6c. Distribution of albacore CPUEs by U.S. troll vessels in January 2002 .....	43
Figure 6d. Distribution of albacore CPUEs by U.S. troll vessels in February 2002 .....	44
Figure 6e. Distribution of albacore CPUEs by U.S. troll vessels in March 2002 .....	45
Figure 6f. Distribution of albacore CPUEs by U.S. troll vessels in April 2002 .....	46
Figure 7. Length-frequency histogram of North Pacific albacore caught by U.S. troll vessels during the 2002 season .....	47
Figure 8. Length-frequency histogram of South Pacific albacore caught by U.S. troll vessels during the 2001-2002 season .....	48

# **SUMMARY OF THE 2002 U.S. NORTH AND SOUTH PACIFIC ALBACORE TROLL FISHERIES**

John Childers  
Southwest Fisheries Science Center  
National Marine Fisheries Service, NOAA  
La Jolla, CA 92037

## **INTRODUCTION**

Albacore (*Thunnus alalunga*) are commercially harvested in the North Pacific by fisheries from various nations (Table 1). Japan harvests the greatest amount, annually taking 74% (since 1952) of the total amount of North Pacific albacore landed by all nations; the U.S. annually harvests less than 20%. U.S. vessels fish for albacore in the Pacific primarily with troll (also called jig) gear (artificial lures with barbless hooks that are towed behind a vessel). U.S. troll vessels have fished for albacore in the North Pacific since the early 1900's (Clemens and Craig, 1965). The collection of voluntary logbook data from the U.S. North Pacific albacore troll fishery began in 1954 (Laurs et al., 1975a). The collection of length-frequency data from the U.S. North Pacific albacore troll fishery began in 1951. The agencies currently involved in the collection of voluntary logbook, length-frequency, and catch information from the U.S. Pacific albacore troll fisheries are the National Marine Fisheries Service's (NMFS) Southwest Fisheries Science Center (SWFSC, La Jolla Laboratory) and Pacific Islands Fisheries Science Center (PIFSC, Honolulu), Western Fishboat Owners Association (WFOA), American Fishermen's Research Foundation (AFRF), Pacific States Marine Fisheries Commission (PSMFC), and the state fisheries agencies of California, Oregon, and Washington.

Beginning in 1971, cooperative surveys between NMFS and AFRF led to the expansion of areas fished by U.S. troll vessels to areas north of Hawaii and west of the International Dateline (Laurs, et al., 1975b). In recent years, the North Pacific albacore troll season has begun as early as mid-April in areas northwest of Midway Island. In July and August, fishing effort expands to the east (160°W to 130°W, and 40°N to 45°N), and along the west coast of North America. Fishing areas along the west coast of North America extend from Vancouver Island to southern California. Fishing can continue into November if weather permits and sufficient amounts of albacore remain available to troll gear.

Albacore are also harvested in the South Pacific by a variety of nations (Table 2). Taiwan currently harvests the largest proportion of albacore caught annually in the South Pacific (40% on average since 1963). The annual U.S. portion of the South Pacific albacore catch has averaged 6% since 1983.

Exploratory fishing for albacore with troll gear in areas east of New Zealand in 1986 resulted in the expansion of the U.S. albacore troll fishery to the South Pacific (Laurs et al., 1987). The collection of logbook and catch data from the fishery began in 1986, while length-frequency data has been collected since 1987. The fishery takes place during the austral summer months (November through April). U.S. troll vessels that participate in the South Pacific fishery depart from the U.S. west coast or Hawaii after the end of the North Pacific season and travel to

American Samoa or French Polynesia to prepare for the South Pacific season. South Pacific albacore fishing areas extend from the International Dateline to approximately 110°W between 25°S and 50°S. At the end of the season (March or April), most troll vessels unload in American Samoa, Fiji, or Tahiti and then travel to Hawaii or the U.S. west coast to prepare for the next North Pacific fishing season.

This report presents summaries of the logbook (daily catch and effort), catch, and length-frequency information collected from the U.S. fleet during the 2002 North Pacific and the 2001-2002 South Pacific albacore seasons. Data from previous North Pacific seasons, South Pacific seasons, and from other fisheries (where available) are included for comparison. Electronic copies of this report for the years 1995 to 2002 will soon be available on the World Wide Web at <http://swfsc.nmfs.noaa.gov/frd/HMS/Large%20Pelagics/Albacore/albie01.htm>.

## DATA COLLECTED

Total annual catch data from the various fisheries that harvest albacore in the Pacific Ocean are available from 1952 to 2002 (Tables 1 and 2). Total catch estimates for U.S. troll vessels and for at-sea transshipments are provided by WFOA. Catch data from state landing receipts are obtained from the state fisheries agencies of California, Oregon, and Washington, Hawaii and from the Pacific Coast Fisheries Information Network (PacFIN). Daily catch and effort data are obtained from completed copies of the *U.S. Pacific Albacore Logbook*. The logbooks are voluntarily submitted by fishermen, transcribed by port samplers who collect the information from cooperating fishermen, or mailed to the SWFSC by vessel captains and owners. In addition to the voluntary logbook program, U.S. troll vessels that fish for albacore outside any exclusive economic zone (EEZ) are required by the High Seas Fisheries Compliance Act (HSFCA) to mail the logbook data from the time that they fished on the high seas to SWFSC. In the near future, the implementation of a Fisheries Management Plan for U.S. pelagic fisheries in the North Pacific will require that all albacore troll fishermen submit copies of their logbooks. Approximately 1,000 logbooks were distributed to fishermen for the 2002 North Pacific and the 2001-2002 South Pacific albacore seasons. Samplers in the ports of Ilwaco, Washington; Newport, Astoria, and Charleston Oregon; Terminal Island, California; and Pago Pago, American Samoa collected logbook, length-frequency, and landings (catch) data during the 2002 North Pacific season. Samplers in Pago Pago collected logbook, length-frequency, and catch data during the 2001-2002 South Pacific season.

North Pacific sea surface temperature (SST) data are recorded from commercial transport ships, fishing vessels, and research vessels. These data are collected by the National Weather Service's National Centers for Environmental Prediction (NCEP). These data are summarized by month and archived at the Climate Diagnostics Center (<http://www.cdc.noaa.gov/index.html>). The SST data from each month of the North Pacific albacore troll season were compiled with a resolution of 2° of latitude and longitude and computer-analyzed at the SWFSC La Jolla laboratory. Contours of SSTs (isotherms) were created and are displayed with the general catch areas for North Pacific troll-caught albacore in figures 2a through 2f. Analysis of SSTs shows the distribution of isotherms and the locations of temperature fronts (areas of closely-spaced isotherms). Albacore tend to congregate along these fronts in the North Pacific transition zone (Laurs and Lynn, 1977). Currently, there is insufficient SST information available from the

areas of the South Pacific albacore troll fishery (east of New Zealand to 110°W and south of 30°S) to make a similar analysis possible.

### TOTAL CATCH AND EFFORT

Total catch from the 2002 U.S. North Pacific albacore troll fishery decreased to 10,686 metric tons (t) from 11,210 t landed in 2001. An estimated 670 U.S. troll vessels fished in the 2002 North Pacific fishery (Table 3), a 24% decrease from 886 troll vessels that fished in 2001. Fishing effort in the albacore troll fisheries is measured in number of fishing days. The total number of fishing days is estimated by the following equation:

$$Effort(days) = Catch(pounds) \div [CPUE(\frac{fish}{day}) \div AverageWeight(\frac{pounds}{fish})]$$

U.S. troll vessels fished 20,662 days during the 2002 North Pacific albacore season, a 19% decrease from 25,414 days fished in 2001 (Table 3). The average price paid for albacore caught by troll vessels in 2002 was \$1,737 per short ton (87 cents per pound). This is an 8% decrease from the average price of \$1,896 per short ton (95 cents per pound) paid in 2001.

The South Pacific albacore troll fishery begins in November or December and continues into March or April of the following year. As a result, season totals differ slightly from annual totals. The season catches of South Pacific albacore caught by troll gear (Table 4) are converted to annual totals and listed in Table 2. The annual catch of South Pacific albacore caught by troll gear decreased 52% from 2,105 t in 2001 to 1,020 t in 2002. The 2001-2002 season catch by U.S. troll vessels decreased 51% to 1,038 t from 2,128 t landed in the 2000-2001 season. Fourteen U.S. troll vessels participated in the 2001-2002 South Pacific fishery compared to 33 vessels that fished in the 2000-2001 season, a 58% decrease. Total fishing effort for the 2001-2002 South Pacific albacore season is estimated to be 2,853 days, a decrease of 54% from 6,194 days fished in the 2000-2001 season (Table 4). The average price paid for albacore caught by troll vessels in the South Pacific in the 2000-2001 season was \$1,450 per short ton (72 cents per pound), a 24% decrease from the average price of \$1,920 per short ton (96 cents per pound) paid in the 2000-2001 season.

Albacore may be discarded during a fishing trip because they are undersized (less than 58 cm fork length or 9 pounds), damaged, or have spoiled due to refrigeration problems. Forty-one trips (of 302 sampled trips) recorded a total of 6,287 albacore discarded during the 2002 North Pacific troll season. Three trips (of 8 sampled trips) recorded 1,413 albacore discarded during the 2001-2002 South Pacific troll season. Albacore troll vessels catch minor amounts of other fish species, usually while in transit to or from the fishing grounds. The most common species that are incidentally caught include skipjack tuna (*Katsuwonus pelamis*), mahi mahi (*Coryphaena hippurus*), yellowtail (*Seriola lalandi*), Eastern Pacific bonito (*Sarda chiliensis*), bigeye tuna (*Thunnus obesus*), and bluefin tuna (*Thunnus thynnus*).

### DISTRIBUTION OF CATCHES AND SSTs

Albacore catches recorded during the 2002 North Pacific albacore troll season were distributed from 160°E to the west coast of the U.S. and Canada, between approximately 35°N and 50°N (Figure 1). Areas of high catch indicate productive regions where albacore are

available to troll gear. Based on sampled logbook data, the most productive offshore areas were located between 164°E and 168°E from 37°N to 40°N. The highest catch areas along the west coast were off Washington and Oregon between 125°W and 130°W, from 40°N to 49°N.

Figures 2a through 2f show the relationship between catch areas, SST fronts, and isotherm distribution patterns. The areas of highest catch in May were in SSTs ranging from 13°C to 19°C (55°F to 66°F; Figure 2a) between 165°E and 180°. High catch areas in June were located between 163°E to 168°E in SSTs between 11°C and 18°C (52°F and 64°F) and also in SSTs from 14°C to 16°C (57°F and 61°F) between 163°W and 167°W (Figure 2b). During July, high catches were widely distributed throughout the North Pacific transition zone in SSTs that ranged from 14°C to 19°C (57°F to 66°F; Figure 2c). High catch areas along the west coast in July were in SSTs that ranged from 12°C to 17°C (54°F to 61°F). High catch areas in August were again widely spread throughout the North Pacific transition zone and were in SSTs ranging from 13°C to 18°C (55°F to 64°F). High catch areas along the west coast in August extended further south than July, from Vancouver Island to Point Arena in SSTs between 12°C and 17°C (54°F and 63°F, respectively; Figure 2d). In September, high catch areas were spread from 170°E to the west coast, and were in SSTs ranging between 12°C and 19°C (54°F and 66°F, respectively; Figure 2e). High catch areas in October were distributed between 172°W and the west coast in SSTs between 12°C and 17°C (54°F and 63°F, respectively). The areas of highest catch in November were between 125°W and 132°W in SSTs ranging from 13°C to 16°C (55°F to 61°F; Figure 2g).

Albacore catches recorded during the 2001-2002 South Pacific season were summarized by season and month in 5° squares of latitude and longitude (Figures 3a through 3f). The highest albacore catches of the season were made between 150°W and 165°W, from 40°S to 45°S (Figure 3a). The highest catches in December were less than 1,213 fish per 5° of latitude and longitude and were distributed between 145°W and 175°W from 35°S to 45°S (Figure 3b). January's highest catch areas ranged between 155°W and 165°W from 40°S to 45°S (Figure 3c). Catches in February were highest between 150°W and 155°W from 40°S to 45°S (Figure 3d). The highest catches in March were less than 6,626 fish per 5° of latitude and longitude and were distributed between 125°W and 155°W, from 40°S to 45°S (Figure 3e). The highest catches in April were less than 1,213 fish per 5° of latitude and longitude and extended between 120°W and 135°W, from 35°S to 45°S (Figure 3f).

### **CATCH-PER-UNIT EFFORT**

Catch-Per-Unit Effort (CPUE) is used as an indication of relative abundance of albacore available to troll gear, or a measure of fishing success. It is expressed in numbers of fish caught per day fished for the U.S. troll fishery. Catch (in numbers of fish) and effort (in days fished) were summarized from logbook data by 10-day and 1°-square strata in which there was at least one day of fishing effort (Kleiber and Perrin, 1991). Average CPUE is calculated as follows:

$$\text{Average CPUE} = \frac{\sum_{i=1}^n \frac{C_i}{E_i}}{n}$$



Where  $C_i$  is the total sampled catch in the  $i^{\text{th}}$  stratum,  $E_i$  is the total sampled effort in the  $i^{\text{th}}$  stratum, and  $n$  is the total number of strata.

The CPUE for the North Pacific albacore troll fishery declined by approximately 68% between 1962 and 1977, then remained relatively stable between 1977 and 1991 (Figure 4). The CPUE increased from 1991 to 1998 with large fluctuations between 1995 and 1999. CPUEs have increased since 1999, reaching 85 fish per day in the 2002 North Pacific season, a 25% increase from 68 fish per day in the 2001 season (Table 3). The ten-year average from 1993 through 2002 is 62 fish per day.

The CPUE for the U.S. South Pacific albacore troll fishery declined between 1987 and 1993 (Figure 4). The CPUE then peaked at 150 fish per day in 1995 and remained relatively stable at 70 fish per day through 2000. The CPUE for the 2001-2002 South Pacific season is 46 fish per day, roughly the same as 47 fish per day in the 2000-2001 season (Table 4). The ten-year average for CPUE in the South Pacific from 1993 through 2002 is 74 fish per day.

The CPUEs from the 2001 North Pacific season were averaged by season, month, and  $1^\circ$  squares of latitude and longitude. The general distributions of season and monthly CPUEs in 2002 were very similar to the distributions in 2001. The highest CPUEs for the 2002 North Pacific season ranged from 251 to 900 fish per day and were scattered between  $163^\circ\text{E}$  and  $128^\circ\text{W}$ , from  $37^\circ\text{N}$  to  $44^\circ\text{N}$ , (Figure 5a). High CPUEs in May were scattered between  $166^\circ\text{E}$  and  $170^\circ\text{W}$ , from  $34^\circ\text{N}$  to  $39^\circ\text{N}$  (Figure 5b). In June, the highest CPUEs were distributed in two areas: between  $163^\circ\text{E}$  and  $169^\circ\text{E}$ , from  $37^\circ\text{N}$  to  $40^\circ\text{N}$  and between  $164^\circ\text{W}$  and  $168^\circ\text{W}$ , from  $38^\circ\text{N}$  to  $40^\circ\text{N}$  (Figure 5c). The highest CPUEs in July ranged from  $39^\circ\text{N}$  to  $42^\circ\text{N}$  and were again divided in two areas: between  $166^\circ\text{E}$  and  $169^\circ\text{E}$  and between  $166^\circ\text{W}$  and  $169^\circ\text{W}$  (Figure 5d). In August, CPUEs increased along the west coast between  $36^\circ\text{N}$  and  $43^\circ\text{N}$  while CPUEs offshore decreased (Figure 5e). In September, fishing continued in offshore areas, however the highest CPUEs were closer to the west coast between  $125^\circ\text{W}$  and  $128^\circ\text{W}$ , from  $36^\circ\text{N}$  to  $44^\circ\text{N}$  (Figure 5f). In October, CPUEs offshore were highest between  $160^\circ\text{W}$  and  $163^\circ\text{W}$ , from  $41^\circ\text{N}$  to  $44^\circ\text{N}$  while CPUEs along the coast were highest between  $126^\circ\text{W}$  and  $131^\circ\text{W}$ , from  $40^\circ\text{N}$  to  $43^\circ\text{N}$  (Figure 5g). Albacore continued to be available to troll vessels in November and CPUEs were highest between  $127^\circ\text{W}$  and  $130^\circ\text{W}$ , from  $41^\circ\text{N}$  to  $43^\circ\text{N}$  (Figure 5h).

The CPUEs from the 2001-2002 South Pacific season were averaged by season, month, and  $5^\circ$  squares of latitude and longitude. The distributions of CPUEs in the 2001-2002 season were restricted to a narrower latitudinal range than those in the 2000-2001 season, but extended a little further east and west. The highest averaged CPUEs for the 2001-2002 season ranged from 146 fish per day to 211 fish per day and were distributed between  $120^\circ\text{W}$  and  $165^\circ\text{W}$ , from  $35^\circ\text{S}$  to  $45^\circ\text{S}$  (Figure 6a). CPUEs in December 2001 did not exceed 159 fish per day and the highest CPUEs were located between  $160^\circ\text{W}$  and  $165^\circ\text{W}$ , from  $35^\circ\text{S}$  to  $40^\circ\text{S}$  (Figure 6b). CPUEs in January 2002 were highest between  $155^\circ\text{W}$  and  $160^\circ\text{W}$ , from  $40^\circ\text{S}$  to  $45^\circ\text{S}$  (Figure 6c). In February, the highest CPUEs were less than 159 fish per day and were distributed between  $150^\circ\text{W}$  and  $165^\circ\text{W}$ , from  $40^\circ\text{S}$  to  $45^\circ\text{S}$  (Figure 6d). Fishing shifted eastward in March and the highest CPUEs were located between  $120^\circ\text{W}$  and  $125^\circ\text{W}$ , from  $40^\circ\text{S}$  to  $45^\circ\text{S}$  (Figure 6e). The highest CPUEs in April were again distributed between  $120^\circ\text{W}$  and  $125^\circ\text{W}$ , but shifted slightly northward, extending from  $35^\circ\text{S}$  to  $40^\circ\text{S}$  (Figure 6f).

## **LOGBOOK SAMPLING COVERAGE**

Logbook sampling coverage is expressed as the ratio of catches from sampled trips (those trips from which logbook data were received) to total catches. Not all catches from sampled trips are available. For consistent comparison of sampling coverage between seasons, sampled catches are estimated by multiplying numbers of fish caught (recorded in logbooks) by the average weight of those fish and summing these estimates from sampled logbooks.

A total of 302 trips (of 2,361 total trips) were sampled for logbook information during the 2002 North Pacific albacore troll season. Sampled catches totaled 3,050 t, resulting in a logbook sampling coverage rate of 29 %, a substantial decrease from 48% in 2001 (Table 3).

Logbook data from the 2001-2002 South Pacific albacore troll season were collected from 8 of the 15 trips made by U.S. vessels. The sampled catch from these trips is 348 t, resulting in a logbook sampling coverage of 34%, less than half the logbook sampling coverage (72%) in the 2000-2001 season (Table 4).

## **LENGTH-FREQUENCIES**

Port samplers measured 12,723 albacore during the 2002 North Pacific season. Fork lengths of albacore measured during the 2002 North Pacific season ranged from 44 cm (3.9 lb or 1.58 kg) to 96 cm (39.8 lb or 18.1 kg) and averaged 67 cm (13.4 lb or 6.1 kg; Figure 7). The average fork length of albacore measured during the 2001 season is 68 cm (14.3 lb or 6.5 kg). The histogram of length-frequency samples from the 2002 North Pacific season shows one prominent mode centered at 63 cm (11.3 lb or 5.1 kg) and a smaller mode at 75cm (19.0 lb or 8.6 kg). The majority of albacore that are taken in both the North and South Pacific troll fisheries range from three to five years old. Length-weight relationships for North Pacific albacore are taken from Bartoo and Forman, 1993.

Small albacore (less than 58 cm fork length) may not be adequately represented in the length-frequency data collected from the North Pacific fishery. Vessels that sell most of their catch to canneries or buying stations (which may pay less for small fish) might discard small fish when they are abundant in the catches. Troll vessels that sell their fish to markets where small fish are preferred might retain more small fish. These fish are usually not available to port samplers for measuring.

Port samplers measured 723 albacore during the 2001-2002 South Pacific troll season. Sampled (measured) albacore ranged from 47 cm (4.7 lb or 2.1 kg) to 103 cm (49.2 lb or 22.3 kg) and averaged 73 cm (17.5 lb or 7.9 kg). The average fork length of sampled albacore from the 2000-2001 season is 71 cm (16.2 lb or 7.3 kg). Two modes are evident in the histogram of fish sampled in the 2001-2002 season (Figure 8). The first is centered at 64 cm (11.9 lb or 5.4 kg) and the second is centered at 80cm (23.1 lb or 10.5 kg). Albacore from the South Pacific troll fishery range from three to six years of age.

## **LENGTH-FREQUENCY SAMPLING COVERAGE**

Length-frequency sampling coverage is expressed as the ratio of the number of fish sampled (measured) to the total number of fish landed for the season. The total number of fish

landed for the season is estimated by dividing total catch by the average weight of fish landed. During the 2002 North Pacific season 12,723 albacore were measured, resulting in a length-frequency sampling coverage of 0.7%, very similar to the 2001 sampling coverage of 0.8% (Table 3).

Port samplers in Pago Pago, American Samoa measured 723 of the estimated 130,796 albacore landed during the 2001-2002 South Pacific albacore fishery. The length-frequency sampling coverage rate for this season is 0.6%, compared to 1.4% in the 2000-2001 season (Table 4).

## **SUMMARY**

The 2002 U.S. North Pacific albacore troll fishery was slightly less productive than the 2001 fishery. Approximately 670 vessels landed 10,686 t during the 2002 season compared to 886 vessels that landed 11,210 t in 2001, a 5% decrease in total catch. Total effort declined 19% from the 2001 fishing season. The highest catches of albacore in the North Pacific generally are distributed between the 11°C (52°F) and 19°C (66°F) isotherms. The average CPUE for the 2002 North Pacific season increased substantially from 68 fish per day in 2001 to 85 fish per day. Productive catch areas (areas with high CPUEs) ranged between 163°E and 128°W, from 37°N to 44°N. The average fork length of sampled albacore from the 2002 season is 67 cm (13.4 lb or 6.1 kg). The average fork length of albacore measured during the 2001 season is 68 cm (14.3 lb or 6.5 kg). Fish less than 58 cm fork length (9 lb or 4.0 kg) may not be adequately represented in the North Pacific length-frequency samples due to discarding of small fish or marketing practices that prohibited sampling them. Logbook sampling coverage for the North Pacific albacore fishery dropped from 48% in the 2001 season to 29% in 2002. Length-frequency sampling coverage was nearly the same as the 2000 season at 0.7%. Port sampling of the U.S. North Pacific fishery continues to be hampered by funding constraints.

Total catch from the 2001-2002 South Pacific season decreased substantially to 1,038 t from 2,128 t in the 2000-2001 season. The annual catch also decreased from 2,105 t in 2001 to 1,020 t in 2002. Fourteen U.S. troll vessels fished 2,853 days in the 2001-2002 season compared to 33 vessels that fished 6,194 days in the 2000-2001 season. The CPUE for the 2001-2002 season was similar to the CPUE from the 2000-2001 season (46 fish per day). Nearly all statistics (except for CPUE and average fork length) decreased by approximately half their respective values from the 2000-2001 season. The average fork length of albacore measured during the 2001-2002 season is 73 cm (17.5 lb or 7.9 kg), compared to an average fork length of 71 cm (16.2 lb or 7.3 kg) in the 2000-2001 season. Logbook sampling coverage for the 2001-2002 South Pacific albacore troll fishery decreased from 72% in the 2000-2001 season to 34% in the 2001-2002 season. Length-frequency sampling coverage also decreased from 1.4% in the 2000-2001 season to 0.6% in the 2001-2002 season.

## **ACKNOWLEDGMENTS**

I thank the albacore fishermen whose participation in the logbook sampling program make this report possible. WFOA and AFRF provided catch data and financial support for data entry of the logbook and length-frequency data. Nancy Cooper (Oregon Department of Fish & Wildlife), Steve Wertz (California Department of Fish & Game), Wendy Beeghley (Washington

Department of Fish & Wildlife), Russell Porter (Pacific States Marine Fisheries Commission), and Gordon Yamasaki (SWR office in Pago Pago, American Samoa) coordinated the collection of logbook, length-frequency, and catch data as well as other fishery-related information. I also thank the port samplers for their efforts in collecting logbook, length-frequency, and catch information and for distributing the *U.S. Pacific Albacore Logbook*.

I thank the participants of the 18<sup>th</sup> North Pacific Albacore Workshop and many other foreign colleagues for providing catch information of albacore fisheries from their respective countries.

Henry Orr (SWFSC) produced the illustrations for this report. Michelle DeLaFuentes formatted the manuscript and tables. Atilio Coan, Jr., Dr. Paul Crone, and Dr. Gary Sakagawa provided helpful directions, comments and critiques of the manuscript.

### LITERATURE CITED

- Bartoo, N., and T.J. Foreman. 1993. A review of the biology and fisheries for North Pacific albacore (*Thunnus alalunga*). pp. 173-187. In Shomura, R.S., J. Majkowski, and S. Langi (eds.), Interactions of Pacific Tuna Fisheries. Proceedings of the First FAO Expert Consultation on Interactions of Pacific Tuna Fisheries. 3-11 December 1991. Noumea, New Caledonia. FAO Fisheries Technical Paper. No. 336, Vol. 2. Rome, FAO. 439 pp.
- Clemens, H.B., and W.L. Craig. 1965. An analysis of California's albacore fishery. Resources Agency of Calif. Dept. of Fish and Game. Fish Bull. 128. 301 pp.
- Ito, R.Y. and W. A. Machado. 2001. Annual Report of the Hawaii-Based Longline Fishery For 2000. NMFS-SWFSC Admin. Report H-01-07. 39 pp.
- Kleiber, P., and C. Perrin. 1991. Catch-per-effort and stock status in the U.S. North Pacific albacore fishery: Reappraisal of Both. Fishery Bulletin, U.S. 89: 379-386.
- Laurs, R.M., C. Hooker, L. Hreha, and R. Lincoln. 1975a. A Uniform U.S. West Coast Logbook for Albacore, *Thunnus alalunga* (Bonnaterre), and Coastwide Albacore Fishery Data System. Marine Fisheries Review, Vol. 31, No. 11:14-21.
- Laurs, R.M., R.J. Lynn, and R.N. Nishimoto. 1975b. Report of Joint National Marine Fisheries Service – American Fishermen's Research Foundation Albacore Studies Conducted during 1975. NMFS-SWFC Admin. Report LJ-75-84. 49 pp.

- Laurs, R.M. and R.J. Lynn. 1977. Seasonal migration of North Pacific albacore, *Thunnus alalunga*, into North American coastal waters: Distribution, relative abundance, and association with transition zone waters. Fishery Bulletin, Vol. 75, No. 4:795-822
- Laurs, R.M., K. Bliss, J. Wetherall, and B. Nishimoto. 1987. South Pacific albacore fishery exploration conducted by U.S. jig boats during early 1987. NMFS-SWFC Admin. Report LJ-87-22. 31 pp.
- Lawson, T.A. 2001. Secretariat of the Pacific Community Tuna Fishery Yearbook 2000. Secretariat of the Pacific Community, Oceanic Fisheries Programme. 162 pp.
- Shaver, J.A. 1962. Purse Seining for Pacific Albacore. California Fish and Game, Vol. 48, No. 1 :81-82
- Shaw, W. 2001. An update for Canadian tuna fisheries in the north and South Pacific Ocean through 2000. Working Paper NFR-2. Fourteenth Meeting of the Standing Committee on Tuna and Billfish, 9-16 August 2001, Nouméa, New Caledonia. Fisheries and Oceans Canada, Nanaimo, British Columbia, Canada. 9 pp.
- Western Pacific Regional Management Council. 1997 Pelagic Fisheries of the Western Pacific Region 1996 Annual Report. 20 pp.
- Western Pacific Regional Management Council. 1998. Pelagic Fisheries of the Western Pacific Region 1998 Annual Report. 20 pp.
- Western Pacific Regional Management Council. 2002. Pelagic Fisheries of the Western Pacific Region 2000 Annual Report. 29 pp.

**Table 1.** North Pacific albacore catches (in metric tons) by fisheries, 1952-2002.

YEAR	CANADA <sup>2</sup>		JAPAN <sup>3</sup>					KOREA <sup>4</sup>		MEXICO <sup>5</sup>
	TROLL	PURSE SEINE	GILL NET	LONG LINE	POLE & LINE	PURSE SEINE	UNSP. GEAR	GILL NET	LONG LINE	UNSP. GEAR
1952	71	136		26,687	41,787	154	237			
1953	5			27,777	32,921	38	132			
1954				20,958	28,069	23	38			
1955				16,277	24,236	8	136			
1956	17			14,341	42,810		57			
1957	8			21,053	49,500	83	151			
1958	74			18,432	22,175	8	124			
1959	212			15,802	14,252		67			
1960	5	136		17,369	25,156		76			
1961	4			17,437	18,639	7	268			0
1962	1			15,764	8,729	53	191			0
1963	5			13,464	26,420	59	218			0
1964	3			15,458	23,858	128	319			0
1965	15			13,701	41,491	11	121			0
1966	44			25,050	22,830	111	585			0
1967	161			28,869	30,481	89	520			
1968	1,028			23,961	16,597	267	1,109			
1969	1,365			18,006	31,912	521	935			0
1970	390	136		16,283	24,263	317	456			0
1971	1,746			11,524	52,957	902	308			0
1972	3,921		1	13,043	60,569	277	623			100
1973	1,400		39	16,795	68,767	1,353	495			0
1974	1,331		224	13,409	73,564	161	879			1
1975	111		166	10,318	52,152	159	228		2,463	1
1976	278		1,070	15,825	85,336	1,109	272		859	36
1977	53		688	15,696	31,934	669	355		792	0
1978	23		4,029	13,023	59,877	1,115	2,078		228	1
1979	521		2,856	14,215	44,662	125	1,126		0	259
1980	212	136	2,986	14,689	46,742	329	1,179	6	597	31
1981	200		10,348	17,922	27,426	252	663	16	459	8
1982	104		12,511	16,767	29,614	561	440	113	387	7
1983	225		6,852	15,097	21,098	350	118	233	454	33
1984	50		8,988	15,060	26,013	3,380	511	516	136	113
1985	56		11,204	14,351	20,714	1,533	305	576	291	49
1986	30		7,813	12,928	16,096	1,542	626	726	241	3
1987	104		6,698	14,702	19,082	1,205	155	817	182	7
1988	155		9,074	14,731	6,216	1,208	134	1,016	109	15
1989	140		7,437	13,104	8,629	2,521	393	1,023	81	2
1990	302	136	6,064	15,789	8,532	1,995	249	1,016	20	2
1991	139		3,401	17,046	7,103	2,652	392	852	3	2
1992	363		2,721	19,049	13,888	4,104	1,527	271	43	10
1993	494		287	29,966	12,797	2,889	867		43	11
1994	1,998		263	29,612	26,389	2,026	799		43	6
1995	1,720		282	29,080	20,981	1,177	937		43	5
1996	3,591		116	32,492	20,272	581	932		43	21
1997	2,433		359	38,988	32,238	1,068	1,708		43	53
1998	4,188		206	35,769	22,926	1,554	1,278		43	8
1999	2,641		289	33,124	50,369	6,872	1,018		(43)	23
2000	4,465	136	67	29,534	21,549	2,408	816		(43)	428
2001	(4,969)		(67)	(29,534)	(29,587)	(825)	(816)		(43)	(18)
2002	(3,180)		(67)	(29,534)	(29,587)	(825)	(816)		(43)	(0)

<sup>1</sup> Data are from the 18th North Pacific Albacore Workshop, December 4-11 2002, La Jolla, California, USA except as noted.

<sup>2</sup> 1960 Canadian purse seine catch from Shaver (1962). 1994 troll catch from Shaw, 2001.

<sup>3</sup> Japanese pole & line catches include fish caught by research vessels. Longline catches for 1952-1960 exclude minor amounts taken by vessels under 20 metric tons.

<sup>4</sup> Korean longline catches calculated from Y. Gong (pers. comm.) using the ratio of catches in numbers, from the North Pacific. Gillnet catches for 1979-1990 are calculated by multiplying the 1991 CPUE (# fish per pok) by effort (# poks) then multiplying by average weight (1991, 1992: 4.13 kg/fish).

<sup>5</sup> 1998-2002 Mexico catch from purse seine and bait boats. Catches provided by Inter-American Tropical Tuna Commission (M. Hinton, pers.com.)

**Table 1.** Continued

YEAR	TAIWAN		U.S.							OTHERS		GRAND TOTAL
	GILL NET	LONG LINE	POLE & LINE	GILL NET	LONG <sup>6</sup> LINE	PURSE SEINE	SPORT	TROLL <sup>7</sup>	UNSP. GEAR	LONG <sup>8</sup> LINE	TROLL <sup>9</sup>	
1952					46		1,373	23,843				94,198
1953					23		171	15,740				76,807
1954					13		147	12,246				61,494
1955					9		577	13,264				54,507
1956					6		482	18,751				76,464
1957					4		304	21,165				92,268
1958					7		48	14,855				55,723
1959					5		0	20,990	0			51,328
1960					4		557	20,100	0			63,403
1961			2,837		5		1,355	12,055	1			52,608
1962			1,085		7		1,681	19,752	1			47,264
1963			2,432		7		1,161	25,140	0			68,906
1964		26	3,411		4		824	18,388	0			62,419
1965		261	417		3		731	16,542	0			73,293
1966		271	1,600		8		588	15,333	1			66,421
1967		635	4,113		12		707	17,814	0			83,401
1968		698	4,906		11		951	20,434	0			69,962
1969		634	2,996		14		358	18,827	0			75,568
1970		1,516	4,416		9		822	21,032	0			69,504
1971		1,759	2,071		11		1,175	20,526	0			92,979
1972		3,091	3,750		8		637	23,600	(0)			109,620
1973		128	2,236		14		84	15,653	0			106,964
1974		570	4,777		9		94	20,178	0			115,197
1975		1,494	3,243		33		640	18,932	10			89,950
1976		1,251	2,700		23		713	15,905	4			125,381
1977		873	1,497		37		537	9,969	0			63,100
1978		284	950		54		810	16,613	15			99,100
1979		187	303		--		74	6,781	0			71,110
1980	--	318	382	--	--		168	7,556	0			75,195
1981	--	339	748		25		195	12,637	0			71,238
1982	--	559	425		105		257	6,609	21			68,481
1983	--	520	607		6		87	9,359	0			55,039
1984	--	471	1,030		2	3,728	1,427	9,304	0			70,729
1985	--	109	1,498	2	0		1,176	6,415	0			58,279
1986	--	--	432	3			196	4,708	0			45,344
1987	2,514	--	158	5	150		74	2,766	0			48,619
1988	7,389	38	598	15	308		64	4,212	10			45,292
1989	8,350	544	54	4	249		160	1,860	23			44,575
1990	16,701	287	115	29	177	71	24	2,603	4			53,980
1991	3,398	353	0	17	313	0	6	1,845	71			37,594
1992	7,866	300	0	0	337	0	2	4,572	72			55,124
1993		494	0	0	440		25	6,254	0			54,567
1994		586	0	38	546		106	10,978	213		158	73,761
1995		2,504	80	52	883		102	8,045	1		137	66,029
1996		3,594	24	83	1,187	11	88	16,938	0	1,735	505	(82,213)
1997		4,199	73	60	1,652	2	1,018	14,252	1	2,824	404	(101,375)
1998		4,797	79	80	1,120	33	1,208	14,410	2	5,871	286	(93,858)
1999		4,768	60	149	1,540	48	3,621	10,060	1	(6,307)	261	(121,194)
2000		5,866	69	55	940	4	1,798	9,645	3	(6,307)	(490)	(84,486)
2001		(4,641)	(138)	(94)	(1,295)	(51)	(1,635)	(11,210)	(0)	(6,307)	(127)	(91,358)
2002		(4,641)	(400)	(28)	(525)	(3)	(2,357)	(10,686)	(28)	(6,307)	(127)	(89,155)

<sup>6</sup> U.S. Longline catches for 1981 through 2001 include landings in California and Hawaii. Hawaii catches for 1987 through 1999 are from Ito and Machado, 2001. Hawaii catches for 2000 through 2002 are from Ito (pers. Comm.).

<sup>7</sup> U.S. troll catches for 1952-1960 include fish caught by pole & line vessels. U.S. troll catches for 1984-1988 include gillnet catches.

<sup>8</sup> Other longline catches from vessels flying flags of convenience being called back to Taiwan.

<sup>9</sup> Other troll catches from vessels registered in Belize, Cook Islands, Tonga, and Ecuador

**Table 2.** South Pacific albacore catches (in metric tons) by fisheries, 1952-2002.

YEAR	JAPAN			TAIWAN		KOREA		U.S.		CANADA	NEW ZEALAND			FRENCH POLYNESIA	
	GILL NET	LONG <sup>2</sup> LINE	POLE & LINE	GILL NET	LONG LINE	GILL NET	LONG LINE	LONG <sup>3</sup> LINE	TROLL	TROLL	LONG LINE	POLE & LINE	TROLL <sup>4</sup>	LONG LINE	TROLL <sup>5</sup>
1952		154	--												
1953		803	--												
1954		9,578	--		--										
1955		8,625	--		--										
1956		7,281	--		--										
1957		8,757	--		--										
1958		18,490	--		--		146								
1959		17,385	--		--		456								
1960		21,638	45		--		610								
1961		23,412	0		--		330								
1962		34,620	0		--		599								
1963		29,120	16		608		1,367								
1964		19,390	0		629		2,911								
1965		17,793	0		1,640		6,405								
1966		21,627	0		6,669		10,817								
1967		15,104	0		11,497		13,717						5		
1968		6,659	0		12,254		10,138						14		
1969		4,894	0		9,503		9,963						--		
1970		6,507	0		14,484		11,599						50		
1971		4,355	0		15,871		14,482						--		
1972		2,729	22		16,674		14,439						268		
1973		2,452	41		17,741		17,452						484		
1974		1,934	709		16,857		12,194						898		
1975		1,060	0		16,056		9,015						646		
1976		1,836	0		13,206		9,058						25		
1977		2,182	0		21,429		11,229						621		
1978		2,489	0		20,702		11,658						1,686		
1979		2,320	0		14,987		11,411						814		
1980		2,555	1		17,998		10,449						1,468		
1981		4,898	0		14,390		13,342						2,085		
1982		4,822	1		12,634		10,769						2,434		
1983	32	4,991	0		12,069		7,069	5					744		
1984	1,581	3,598	2		11,155		5,321	9					2,773		
1985	1,928	3,676	0		9,601		13,544	11					3,253		
1986	1,936	4,466	0		11,913		15,877		92				1,911		
1987	919	4,103	9		15,009		6,821		838				1,256		
1988	4,271	6,914	0	1,000	17,120		6,563	1	3,656	235			405		
1989	13,263	5,353	0	8,520	10,867	172	5,151		3,672	235	9		4,361		102
1990	5,567	5,466	0	1,859	11,619		3,947		3,886	235	170	242	2,599	20	355
1991		4,700	0	1,394	16,508		1,866	1	4,894	235	85	9	2,365	100	391
1992		5,268	0		20,956		2,271		2,956	235	209	6	3,272	195	115
1993		8,294	12		17,701		1,083	0	1,010	235	345	60	2,982	714	86
1994		8,883	2		19,731		0	1	2,270	235	635	62	4,620	913	61
1995		7,350	0		12,775		8	1	1,951	235	810	136	5,349	772	255
1996		4,538	0		11,909		215	86	1,947	136	1,079	26	5,241	1,463	153
1997		5,094	12		15,662		845	309	1,739	149	847	0	2,781	2,595	102
1998		6,955	27		13,812		3,514	446	1,618	167	2,057	1	4,468	3,189	38
1999		7,405	100		13,684		1,552	338	1,339	253	2,103	0	1,800	2,580	61
2000		4,669	22		15,917		916	626	2,433	351	1,344	72	3,084	3,473	97
2001		(4,669)	(22)		(12,026)		(916)	3,232	(2,105)	(206)	(2,093)	(4)	(3,256)	(4,261)	(155)
2002		(4,669)	(22)		(12,026)		(916)	(5,944)	(1,020)	(206)	(2,093)	(4)	(3,256)	(4,261)	(155)

<sup>1</sup> Data are from the Fifteenth Meeting of the Standing Committee on Tuna and Billfish and SPC Tuna Fishery Yearbook 2001, except as noted. All catches are from areas within the SPAR statistical area except as noted.

<sup>2</sup> Japan longline catches include catches from Australia-Japan joint venture vessels.

<sup>3</sup> 1982 - 1993 U. S. longline catches are from Pelagic Fisheries of the Western Pacific Region 1996 and 1998 Annual Reports 2000 - 2002 catches are from the Western Pacific Fishery Information Network.

<sup>4</sup> 1990 - 2001 New Zealand troll include unclassified vessels.

<sup>5</sup> French Polynesia troll catches include catches from Bonitier and Poti Marara vessels. No Japanese data available from SCTB15.



**Table 2.** Continued

YEAR	AUSTRALIA		NEW CALEDONIA	TONGA	FIJI	WESTERN SAMOA	SOLOMON ISLANDS	CHILE <sup>7</sup>	VANUATU	OTHER		GRAND TOTAL
	LONG LINE	TROLL <sup>6</sup>	LONG LINE	LONG LINE	LONG LINE	LONG LINE	LONG LINE	DRIFT NET	LONG LINE	LONG <sup>8</sup> LINE	TROLL <sup>9</sup>	
1952												154
1953												803
1954												9,578
1955												8,625
1956												7,281
1957												8,757
1958												18,636
1959												17,841
1960												22,293
1961												23,742
1962												35,219
1963												31,111
1964												22,930
1965												25,838
1966												39,113
1967												40,323
1968												29,065
1969												24,360
1970		100										32,740
1971		100										34,808
1972		100										34,232
1973		100					4					38,274
1974		100										32,692
1975		100										26,877
1976		100					6					24,231
1977		100					9					35,570
1978		100					9					36,644
1979		100					21					29,653
1980		100					25					32,596
1981		5					2					34,722
1982		6		106			8					30,780
1983		7	12	143			19					25,091
1984		8	112	135			19					24,713
1985	0	9	131	174			12					32,339
1986	0	10	179	206								36,590
1987	129	11	563	252								29,910
1988	107	12	584	242								41,110
1989	93	13	566	195	3							52,575
1990	124	15	1,053	152	68					4		37,381
1991	158	20	909	171	208						4	34,018
1992	214	70	692	199	243							36,901
1993	186	55	755	231	463	213				1		34,426
1994	357	70	840	343	842	641				29	46	40,581
1995	438	25	332	379	702	1,883	15	109	51	115		33,715
1996	408	50	414	431	1,446	1,775	100	21	192	63	192	(31,886)
1997	302	50	277	464	1,842	4,108	109	0	95	113	327	(37,821)
1998	460	50	860	616	2,121	4,742	370	0	10	46	367	(45,934)
1999	359	50	690	801	2,279	4,027	136	0	--	3,558	95	(43,210)
2000	381	50	895	862	6,065	4,067	224	0	--	2,158	372	48,078
2001	(570)	(50)	(1,020)	(1,268)	(7,971)	(4,820)	(54)	(0)	--	(2,760)	187	(51,645)
2002	(570)	(50)	(1,020)	(1,268)	(7,971)	(4,820)	(54)	(0)	--	(2,760)	(164)	(53,249)

<sup>6</sup> Australia troll catches from 1970 to 1980 are incidental catches from pole-and-line vessels targeting southern bluefin tuna. 1981-1998 catches include recreational catches.

<sup>7</sup> Chile gill net catches are from outside the SPAR statistical area and are from R. Serra (pers. comm.).

<sup>8</sup> "Other" includes Cook Islands, Papua New Guinea, and China.

<sup>9</sup> "Other" includes Fiji, Cook Islands, Belize, Sweden, Tonga, and Ecuador.

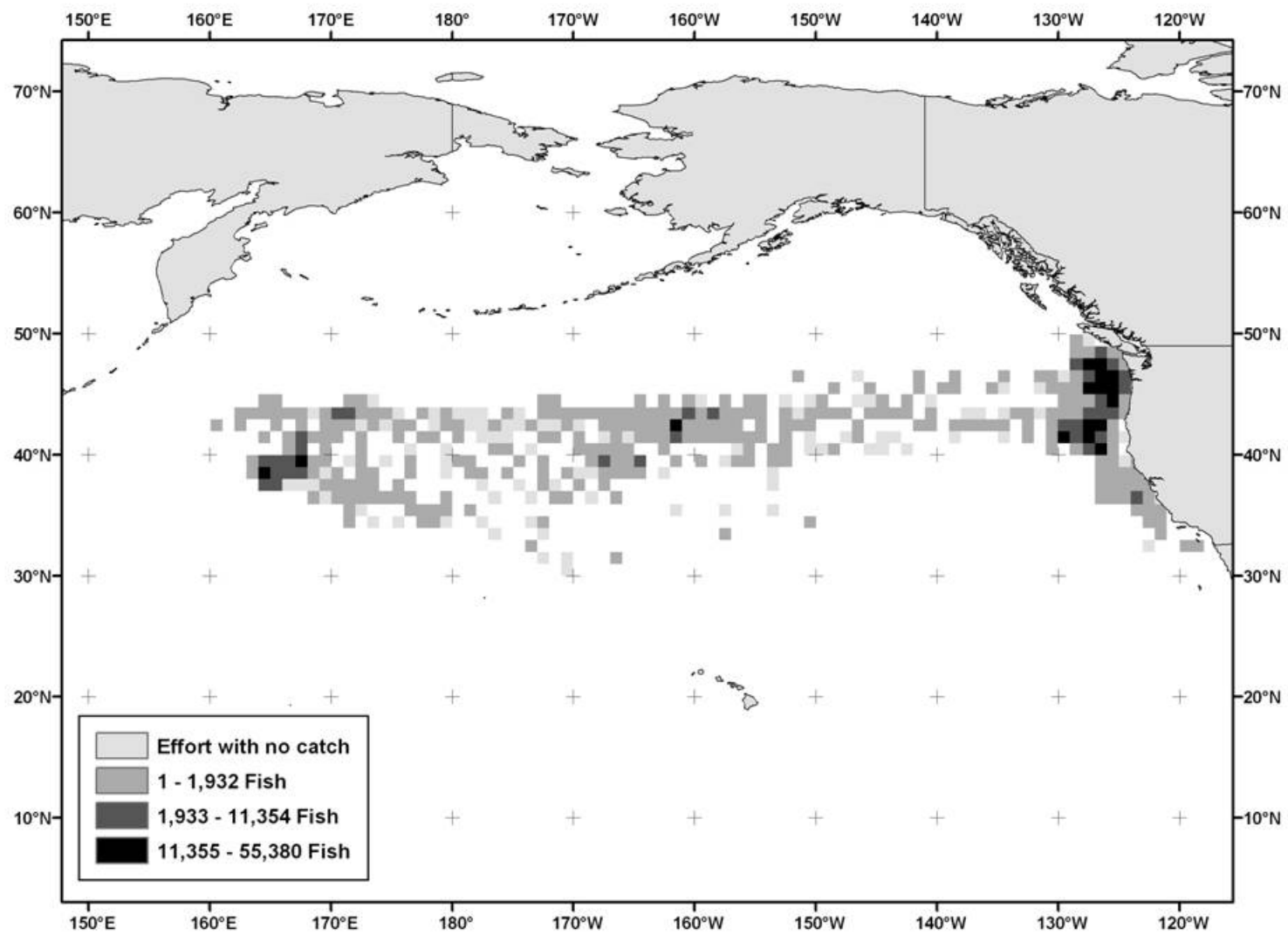
**Table 3.** Fishery statistics for the U.S. North Pacific albacore troll fishery.

FISHING SEASON	NO. TRIPS		CATCH (Metric Tons)		NO. FISH LANDED		AVG FL (cm)	AVG WT (lb)	EFFORT		CPUE (fish/day)	SAMPLING COVERAGE	
	TOTAL	SAMPLED	TOTAL	SAMPLED	TOTAL	MEASURED			NO. DAYS	NO. VESSELS		LOG	L-F
1992	1,590	300	4,572	1,940	864,042	25,054	64	12.0	17,032	604	50	42%	2.8%
1993	2,176	174	6,254	1,290	910,470	204	70	16.0	23,988	610	38	20%	0.0%
1994	2,281	407	10,978	4,620	1,455,364	1,118	72	16.0	23,466	714	62	42%	0.0%
1995	993	354	8,045	4,930	1,185,078	16,222	70	14.0	25,124	518	48	62%	1.4%
1996	1,678	413	16,938	7,030	2,934,184	35,070	66	12.0	31,838	710	92	42%	1.2%
1997	3,496	493	14,252	5,434	2,049,496	32,072	70	16.0	45,548	1,194	44	38%	1.6%
1998	2,105	267	14,410	5,064	2,212,148	16,506	68	14.0	20,516	788	108	36%	0.8%
1999	2,348	390	10,060	3,468	1,262,510	15,278	74	18.0	34,026	736	38	34%	1.2%
2000	2,043	422	9,645	3,724	1,438,696	13,046	68	14.0	37,072	660	38	38%	1.0%
2001	3,114	469	11,210	5,454	1,731,676	13,858	68	14.0	25,414	886	68	48%	0.8%
2002	2,361	302	10,686	3,050	1,756,486	12,723	67	13.4	20,662	670	85	29%	0.7%

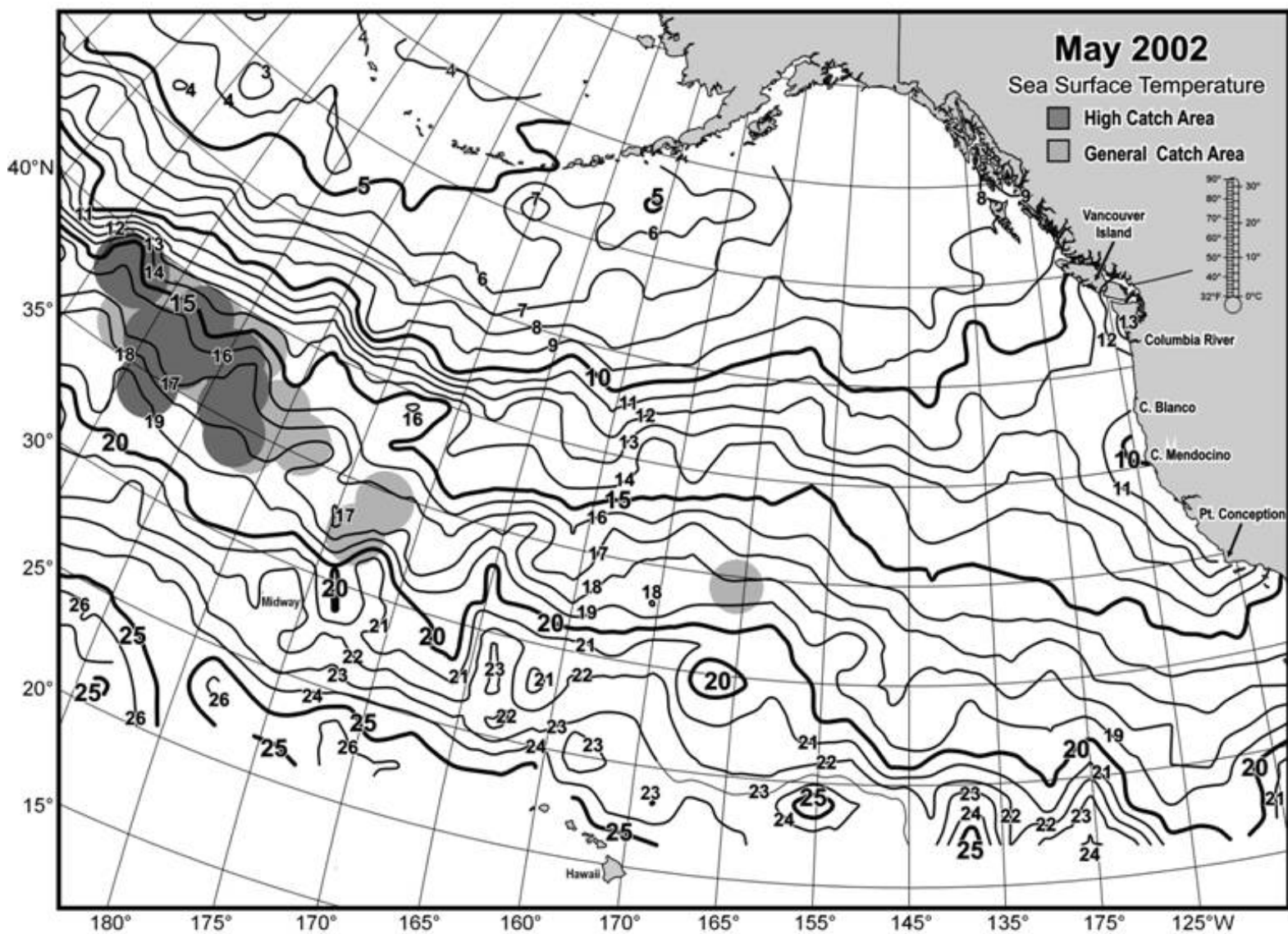
**Table 4.** Fishery statistics for the U.S. South Pacific albacore troll fishery.

FISHING SEASON	NO. TRIPS		CATCH <sup>1</sup> (Metric Tons)		NO. FISH LANDED		AVG FL (cm)	AVG WT (lb)	EFFORT		CPUE (fish/day)	SAMPLING COVERAGE	
	TOTAL	SAMPLED	TOTAL	SAMPLED	TOTAL	MEASURED			NO. DAYS	NO. VESSELS		LOG	L-F
1991-92	56	39	3,097	1,955	471,433	5,009	68	14.5	6,796	55	69	63%	1.1%
1992-93	43	8	1,036	194	199,519	1,720	63	11.4	4,433	44	45	19%	0.9%
1993-94	12	9	2,236	298	378,002	996	66	13.0	3,918	13	96	13%	0.3%
1994-95	42	22	1,953	1,153	278,519	1,460	70	15.5	1,861	21	150	59%	0.5%
1995-96	48	33	1,964	1,159	283,992	2,226	70	15.2	4,009	53	71	59%	0.8%
1996-97	25	21	1,617	1,038	262,069	1,558	67	13.6	3,165	26	83	64%	0.6%
1997-98	39	34	1,701	1,197	277,174	200	67	13.5	5,191	36	53	70%	0.1%
1998-99	24	15	1,241	658	173,549	790	70	15.8	2,085	21	83	53%	0.5%
1999-2000	39	28	2,562	1,734	326,783	1,355	73	17.3	4,580	36	71	68%	0.4%
2000-2001	39	32	2,128	1,540	290,127	4,029	71	16.2	6,194	33	47	72%	1.4%
2001-2002	15	8	1,038	348	130,796	723	73	17.5	2,853	14	46	34%	0.6%

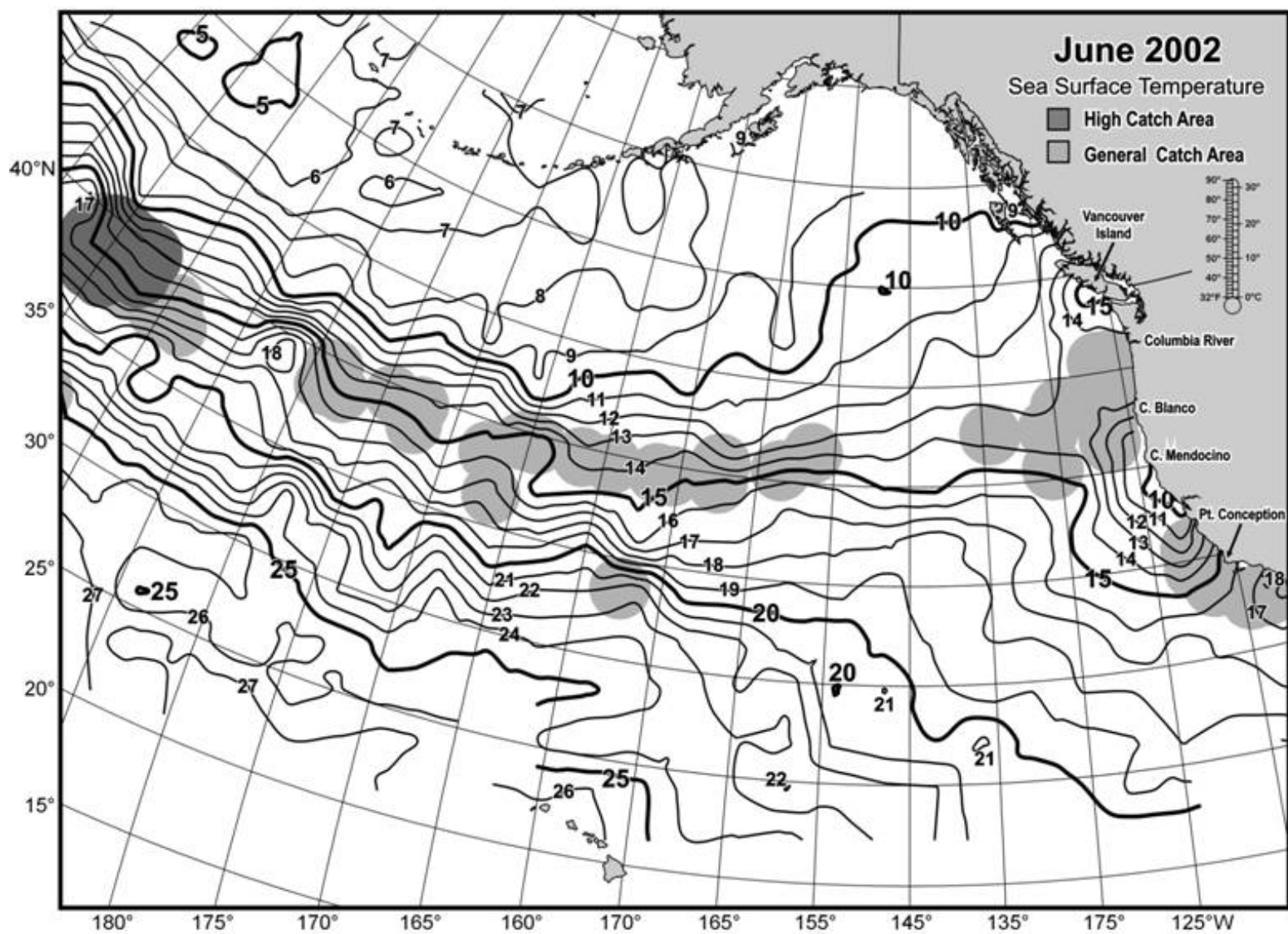
<sup>1</sup> Total catches for U.S. South Pacific albacore troll fishery may include catch from November and December of the previous year. Total catches for seasons before 1996-97 may contain catch from non-U.S. vessels.



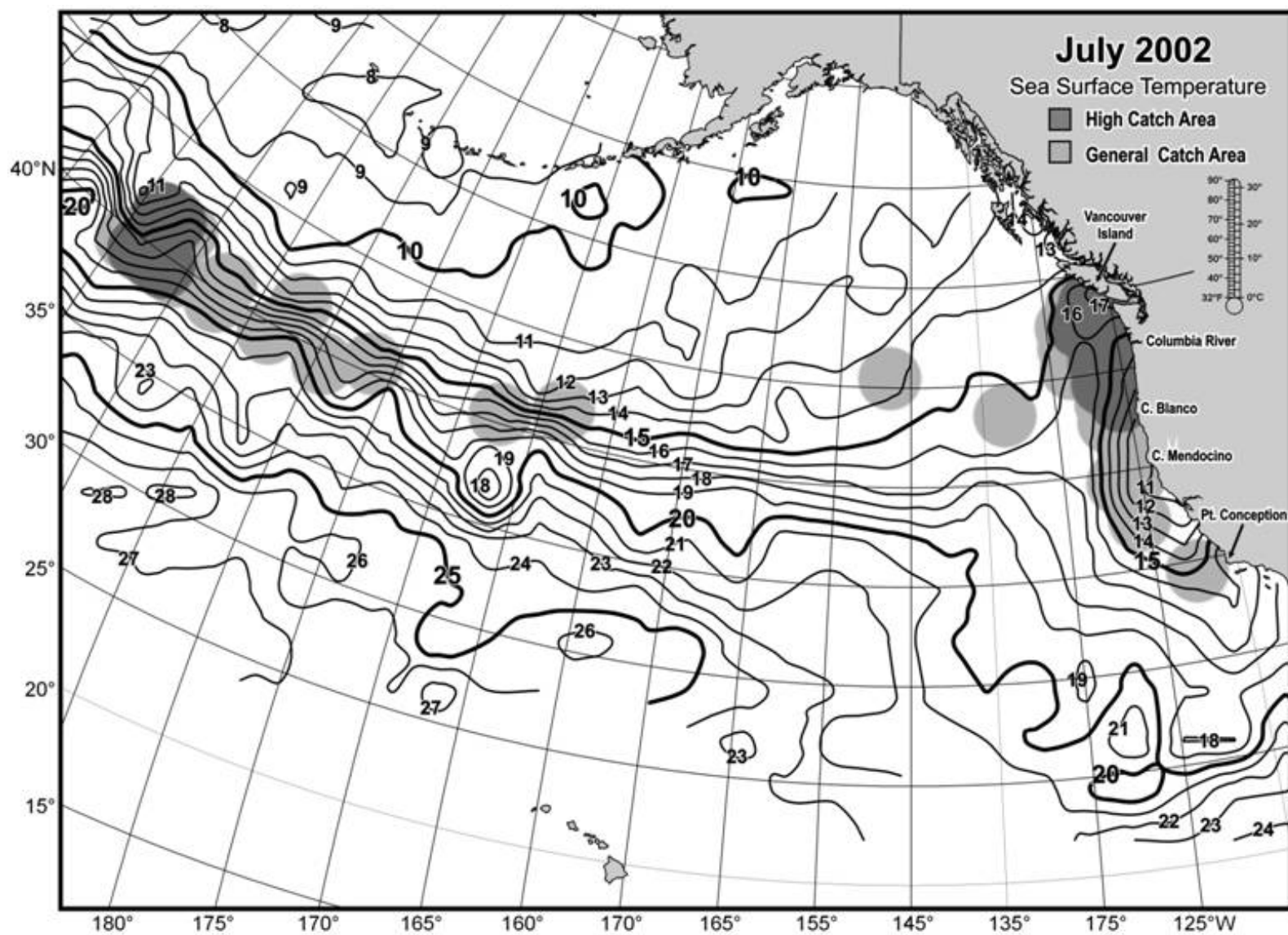
**Figure 1.** Distribution of albacore catches by U.S. troll vessels in the 2002 North Pacific season.



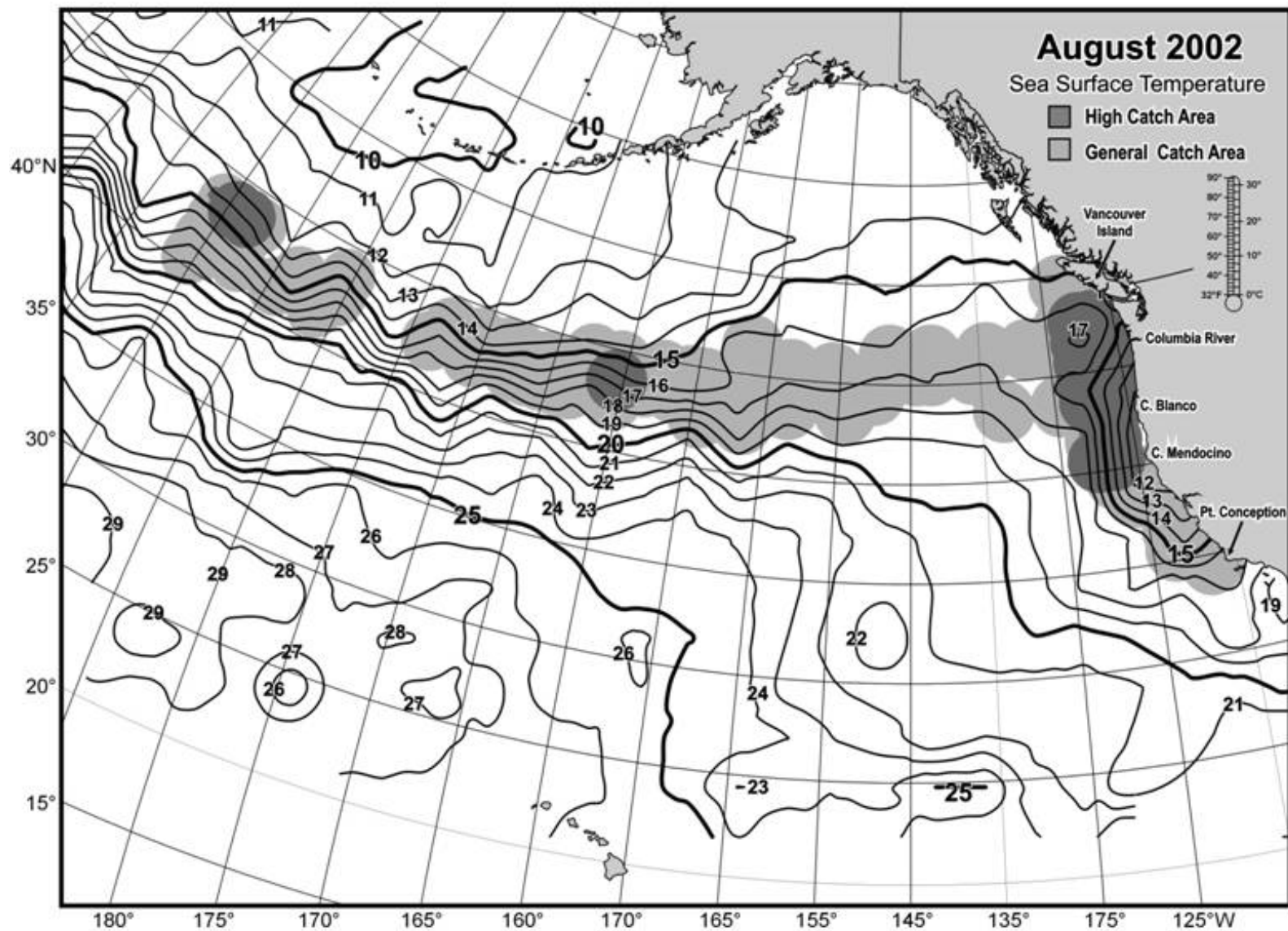
**Figure 2a.** Distribution of albacore catches and sea surface temperatures in May 2002.



**Figure 2b.** Distribution of albacore catches and sea surface temperatures in June 2002.

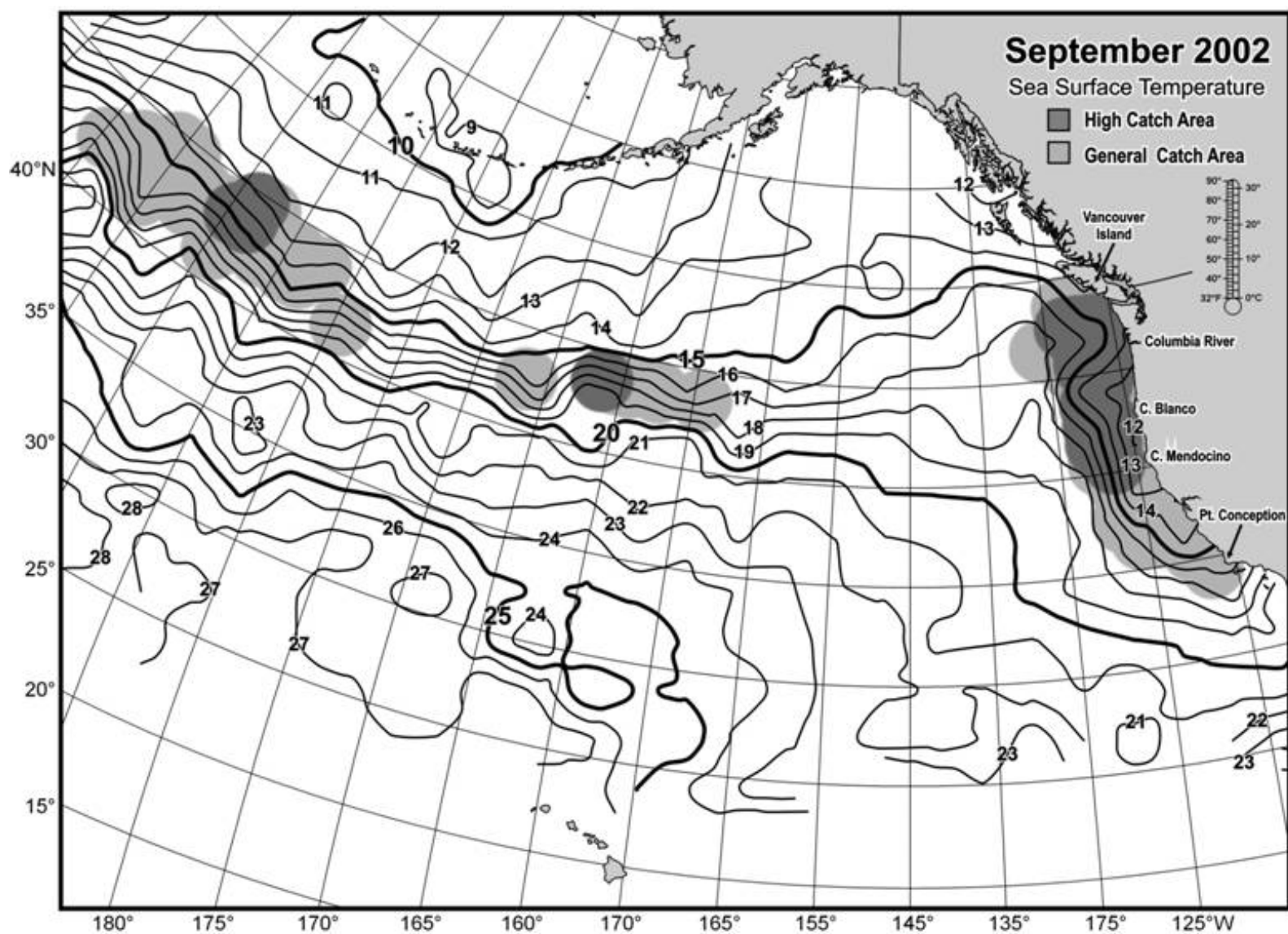


**Figure 2c.** Distribution of albacore catches and sea surface temperatures in July 2002.



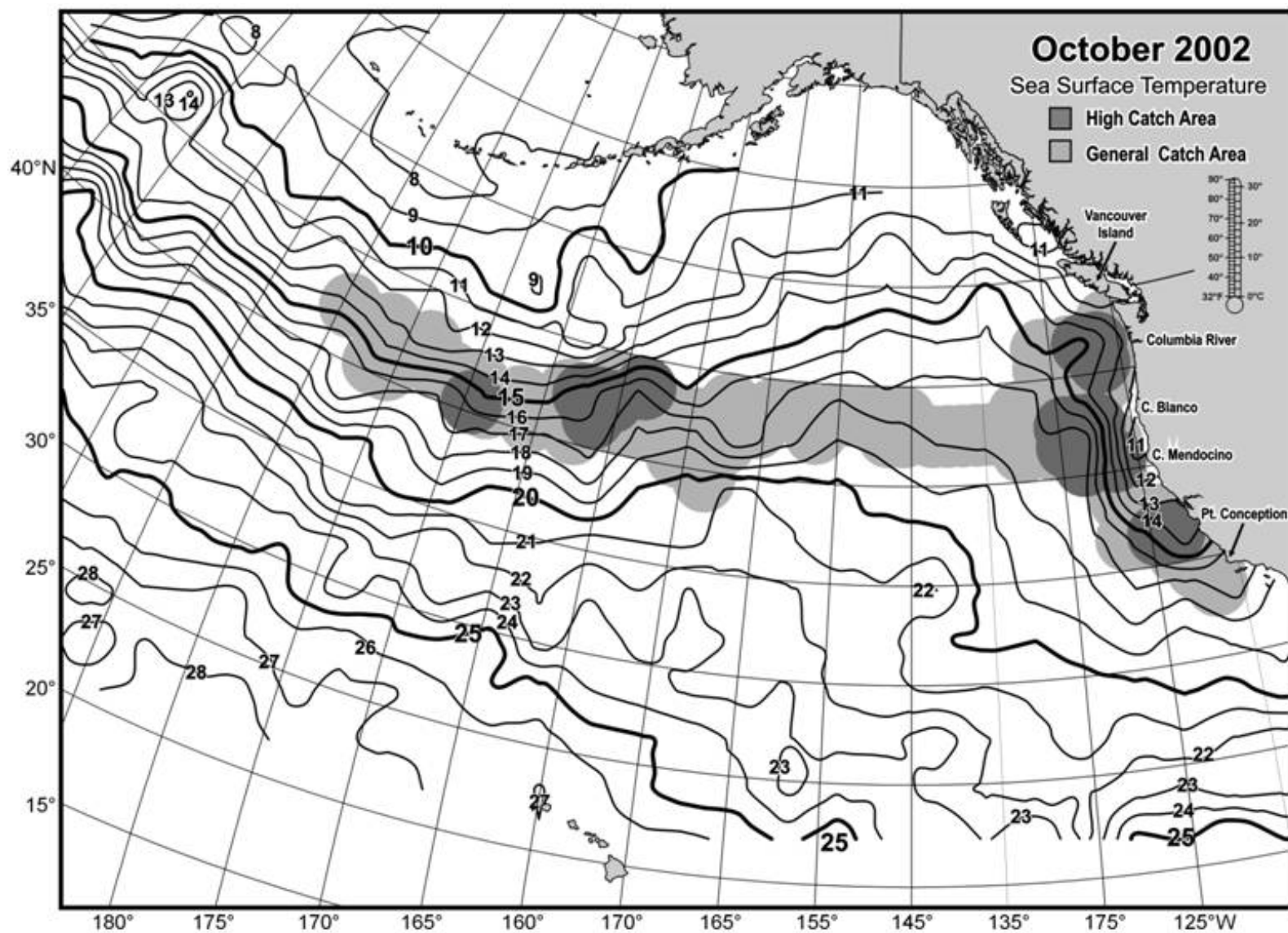
**Figure 2d.** Distribution of albacore catches and sea surface temperatures in August 2002.



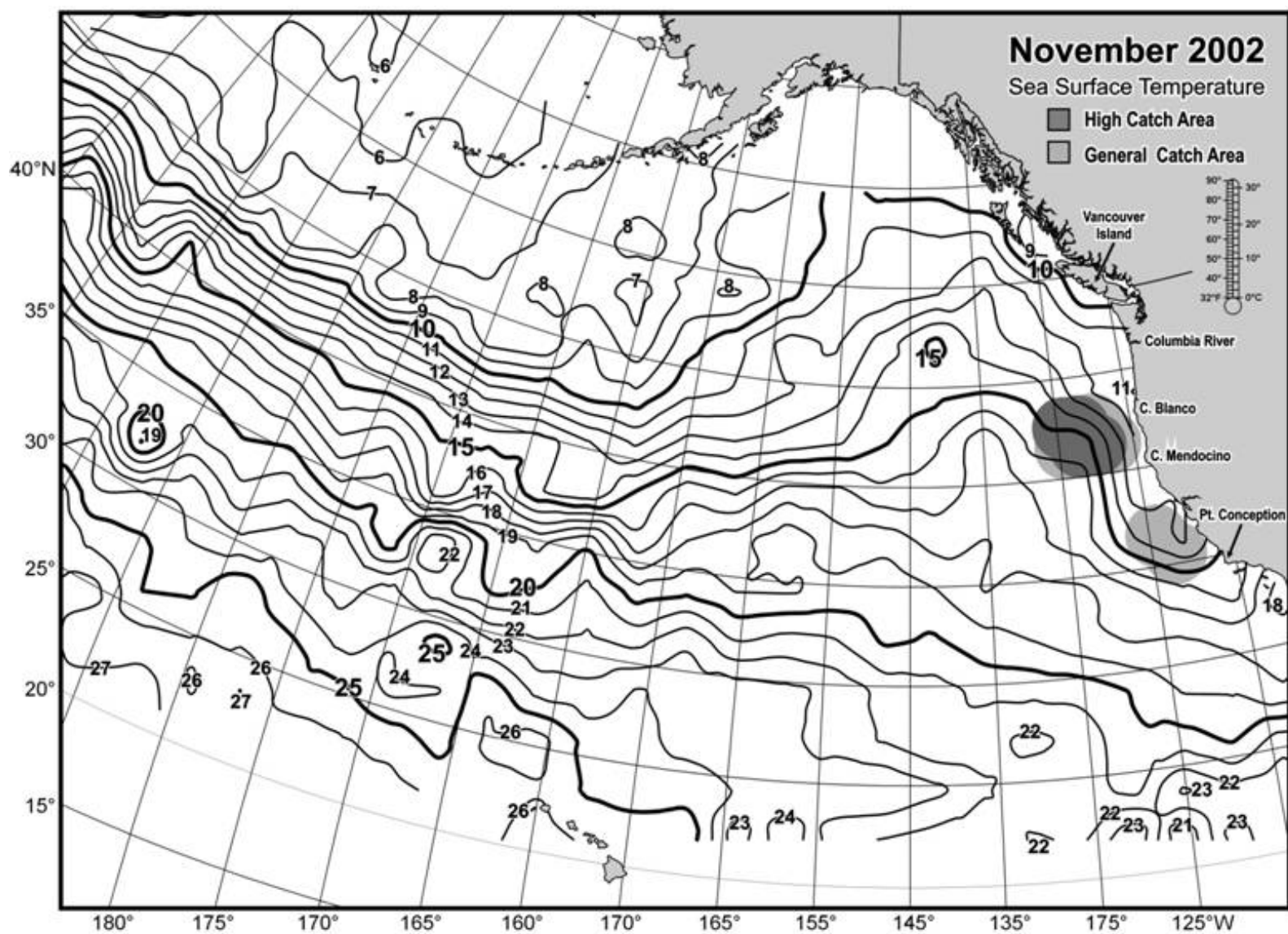


**Figure 2e.** Distribution of albacore catches and sea surface temperatures in September 2002.

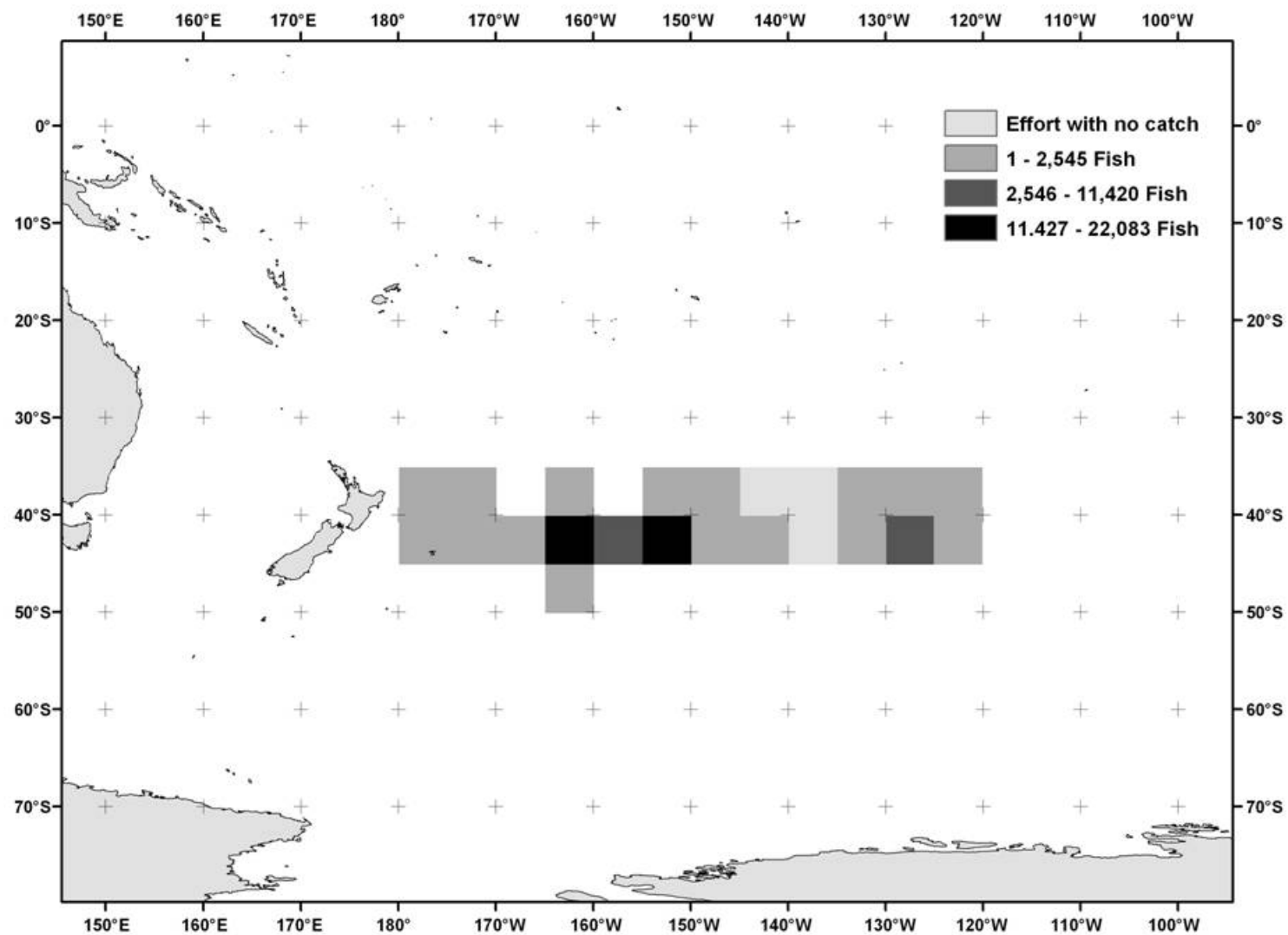




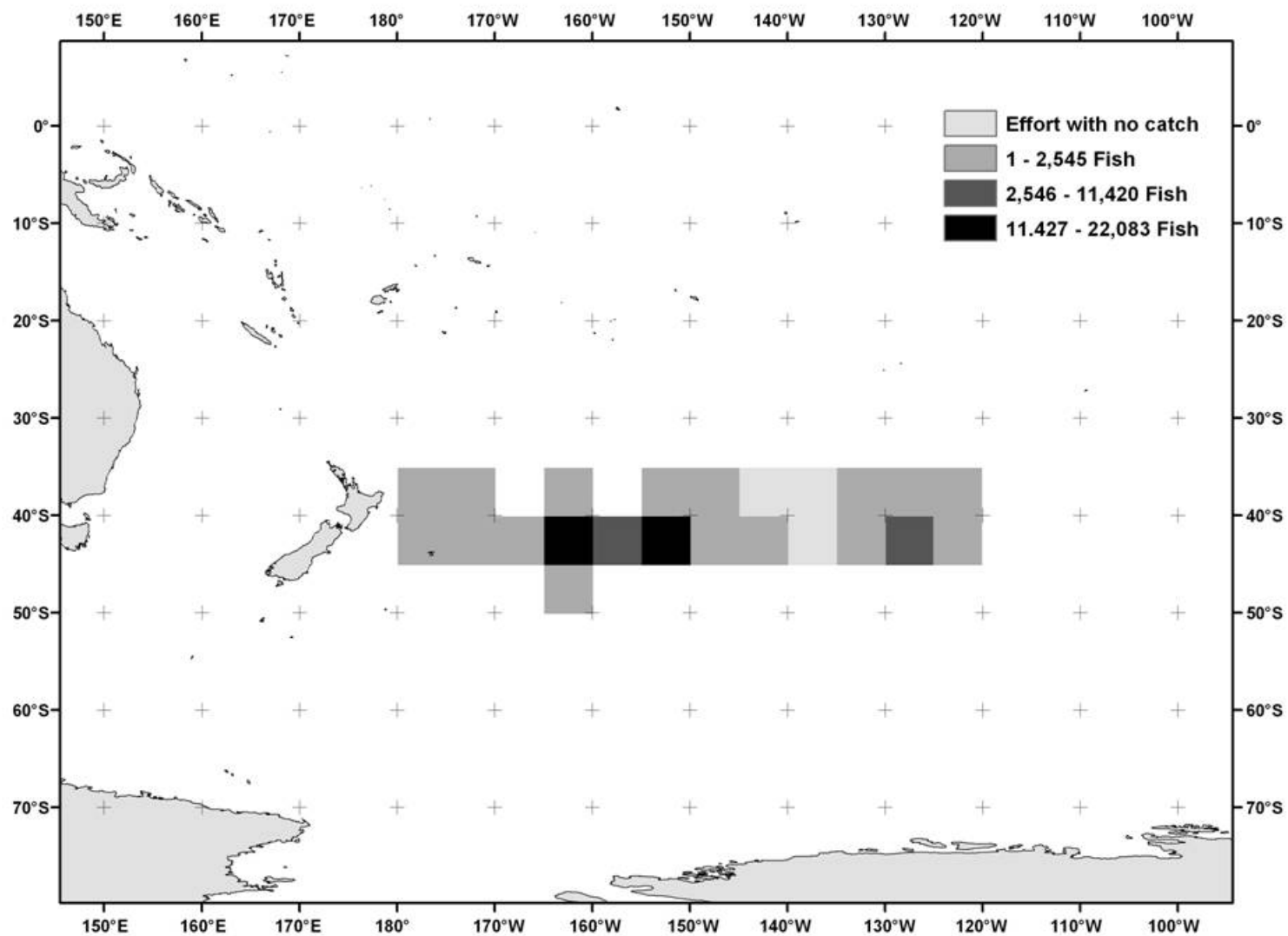
**Figure 2f.** Distribution of albacore catches and sea surface temperatures in October 2002.



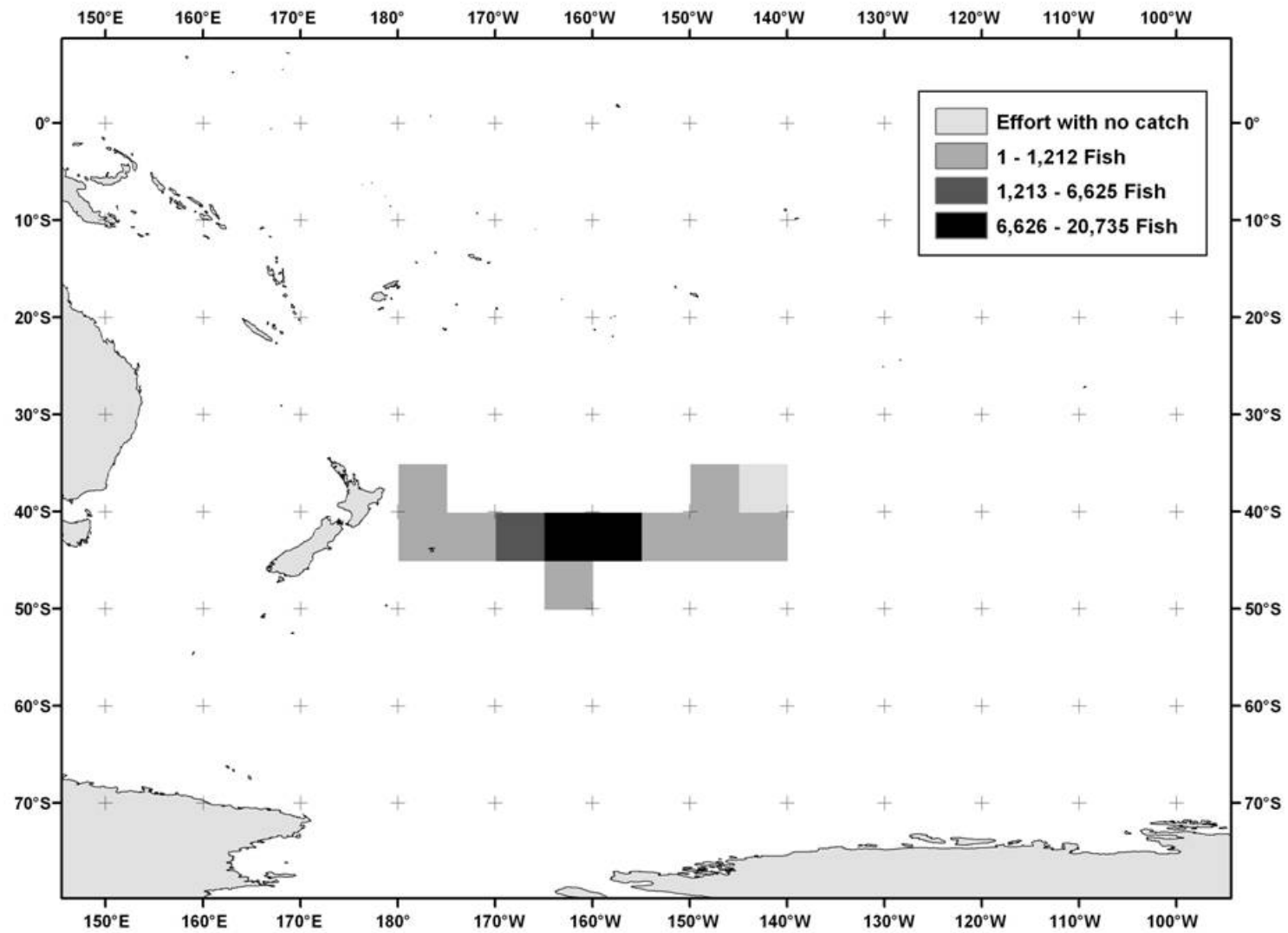
**Figure 2g.** Distribution of albacore catches and sea surface temperatures in November 2002.



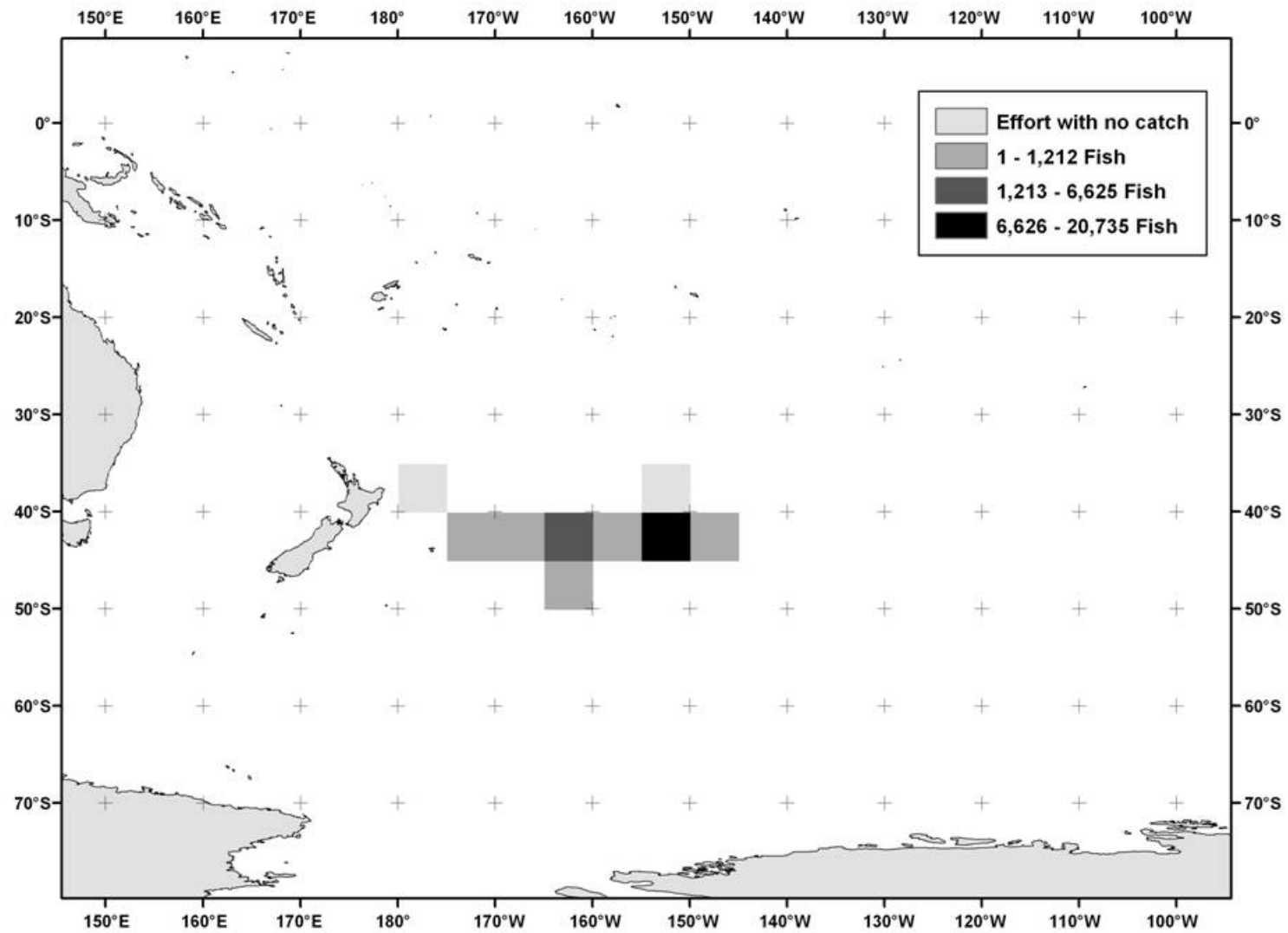
**Figure 3a.** Distribution of albacore catches by U.S. troll vessels in the 2001-2002 South Pacific season.



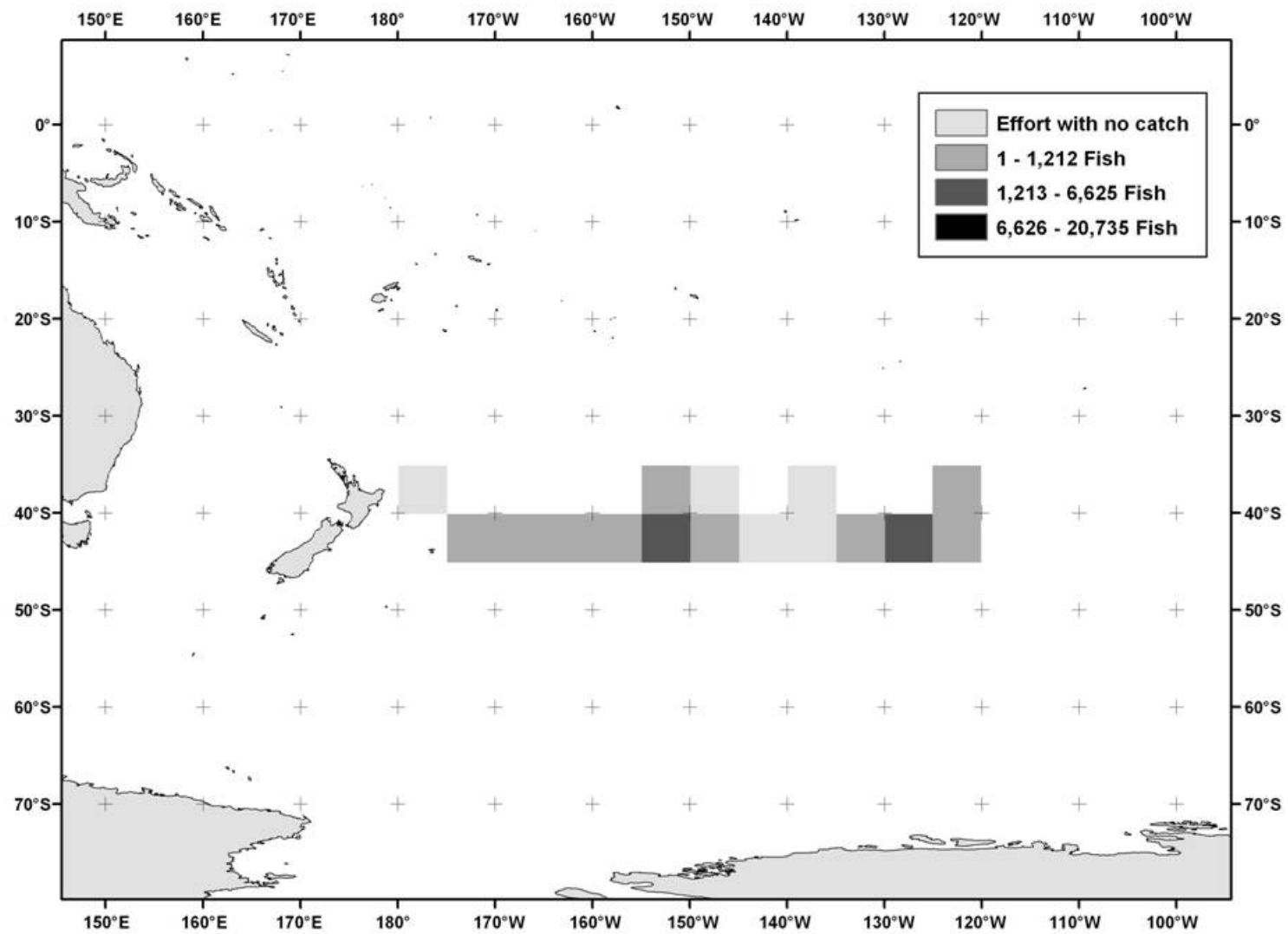
**Figure 3b.** Distribution of albacore catches by U.S. troll vessels in December 2001.



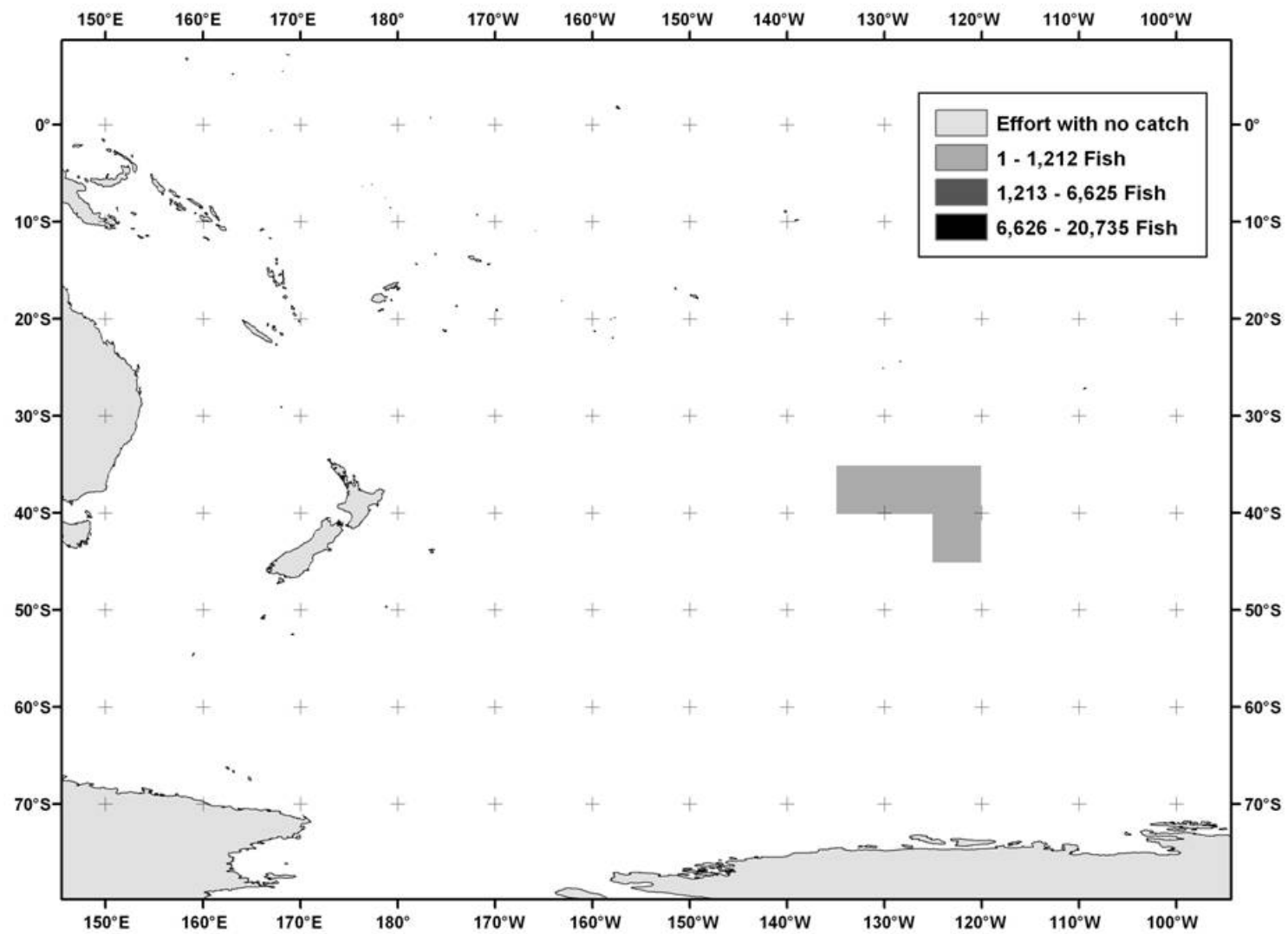
**Figure 3c.** Distribution of albacore catches by U.S. troll vessels in January 2002.



**Figure 3d.** Distribution of albacore catches by U.S. troll vessels in February 2002.

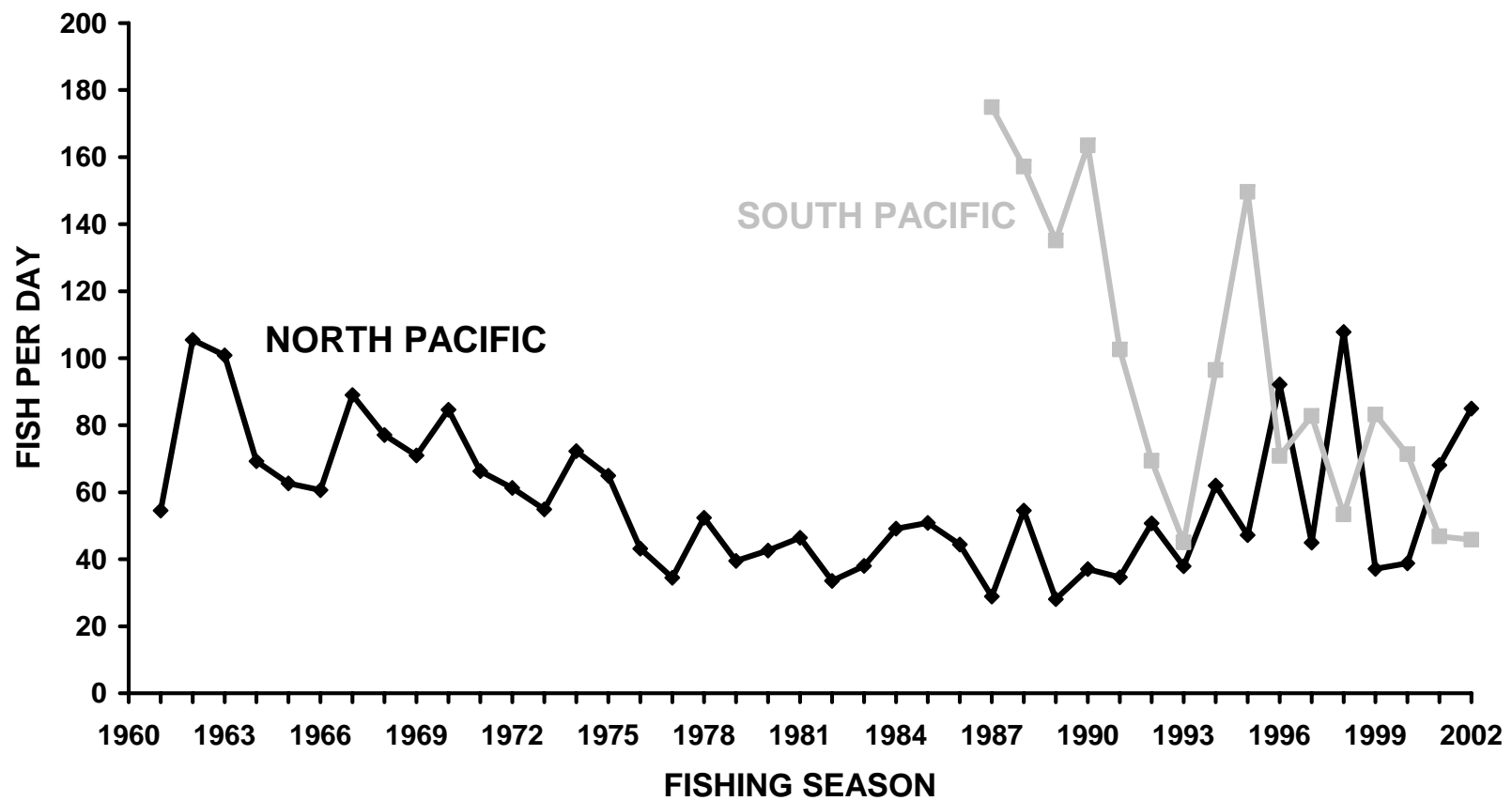


**Figure 3e.** Distribution of albacore catches by U.S. troll vessels in March 2002.

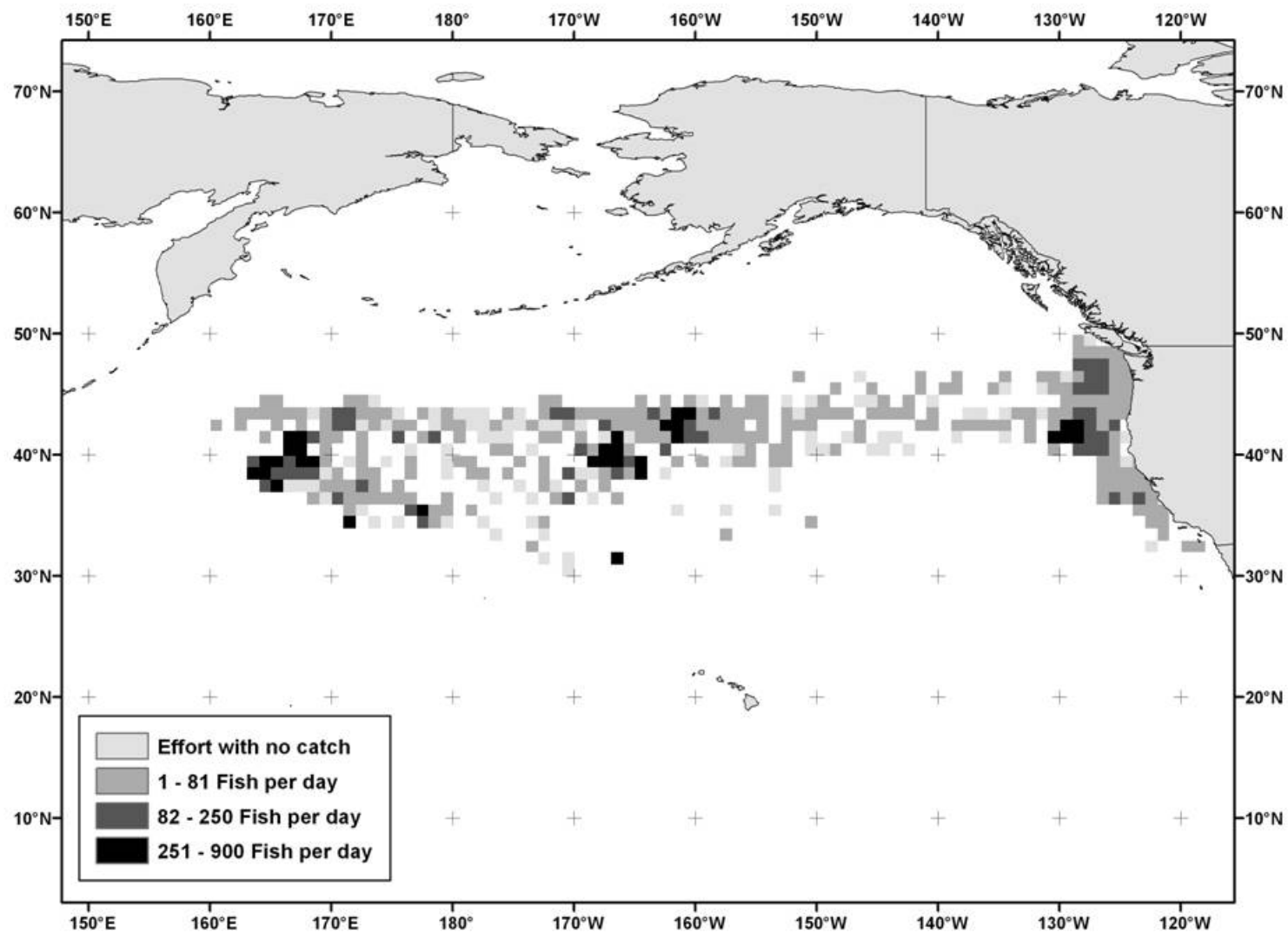


**Figure 3f.** Distribution of albacore catches by U.S. troll vessels in April 2002.

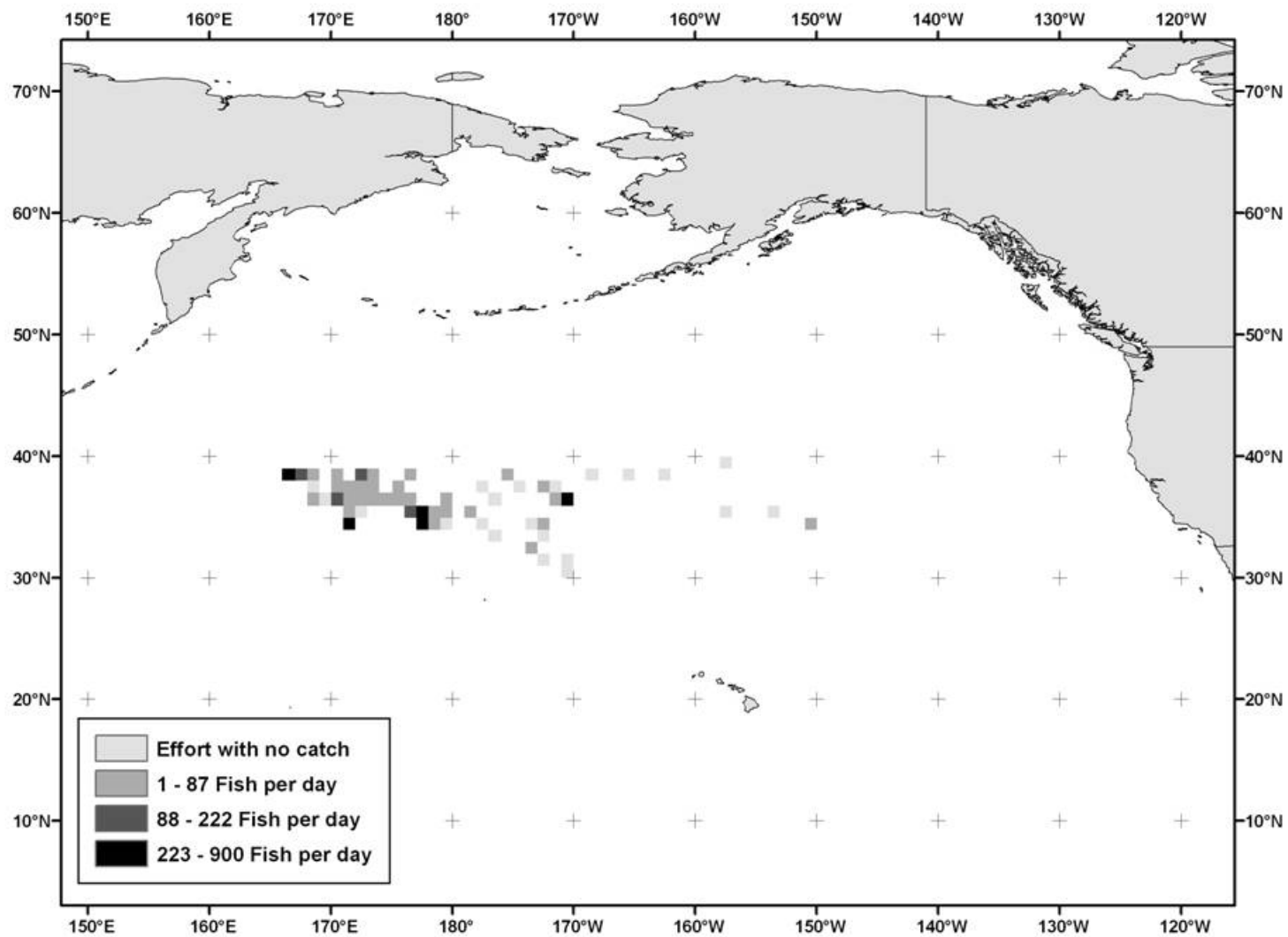




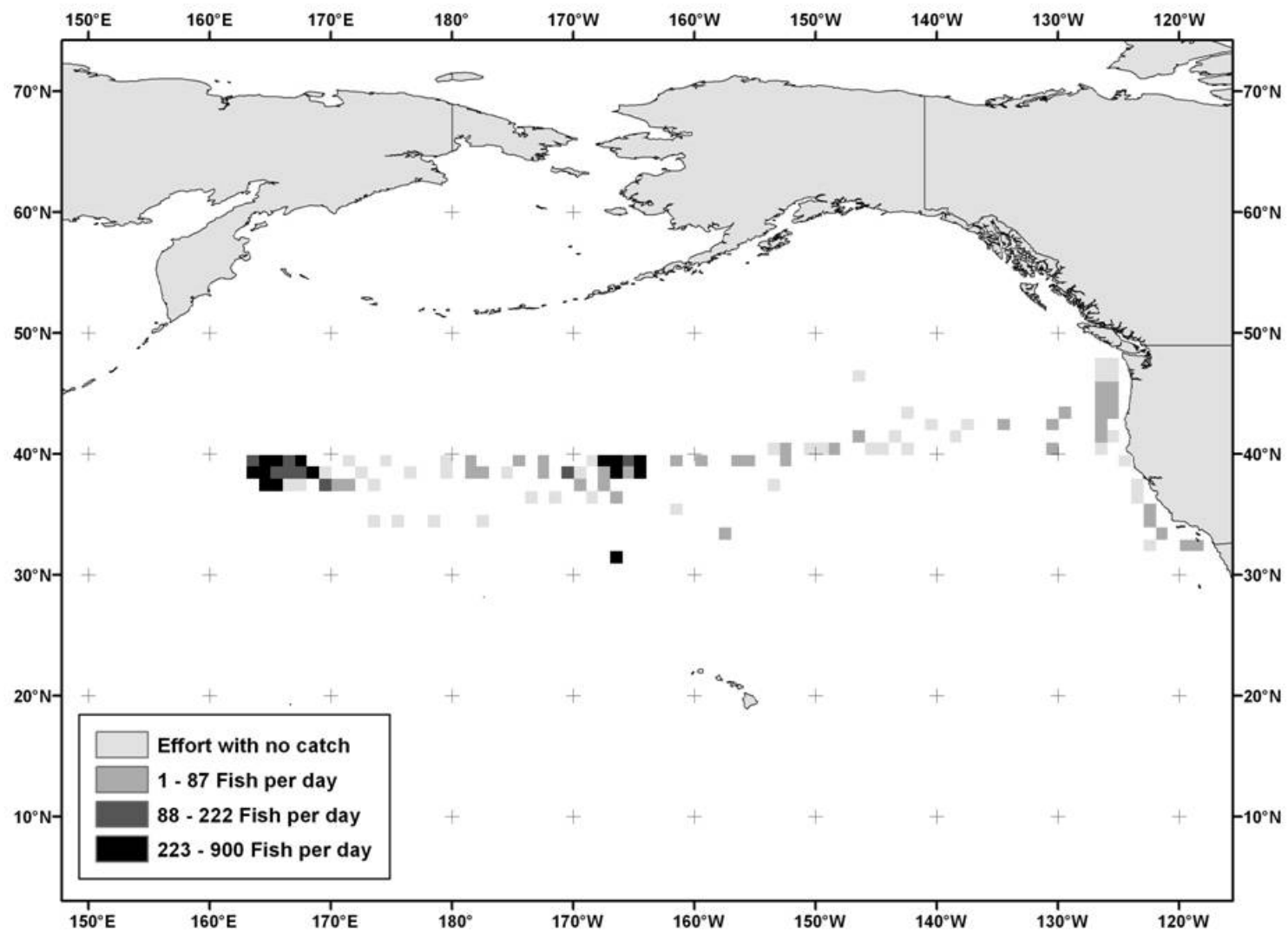
**Figure 4.** North and South Pacific albacore CPUEs by U.S. troll vessels from 1961 through 2002.



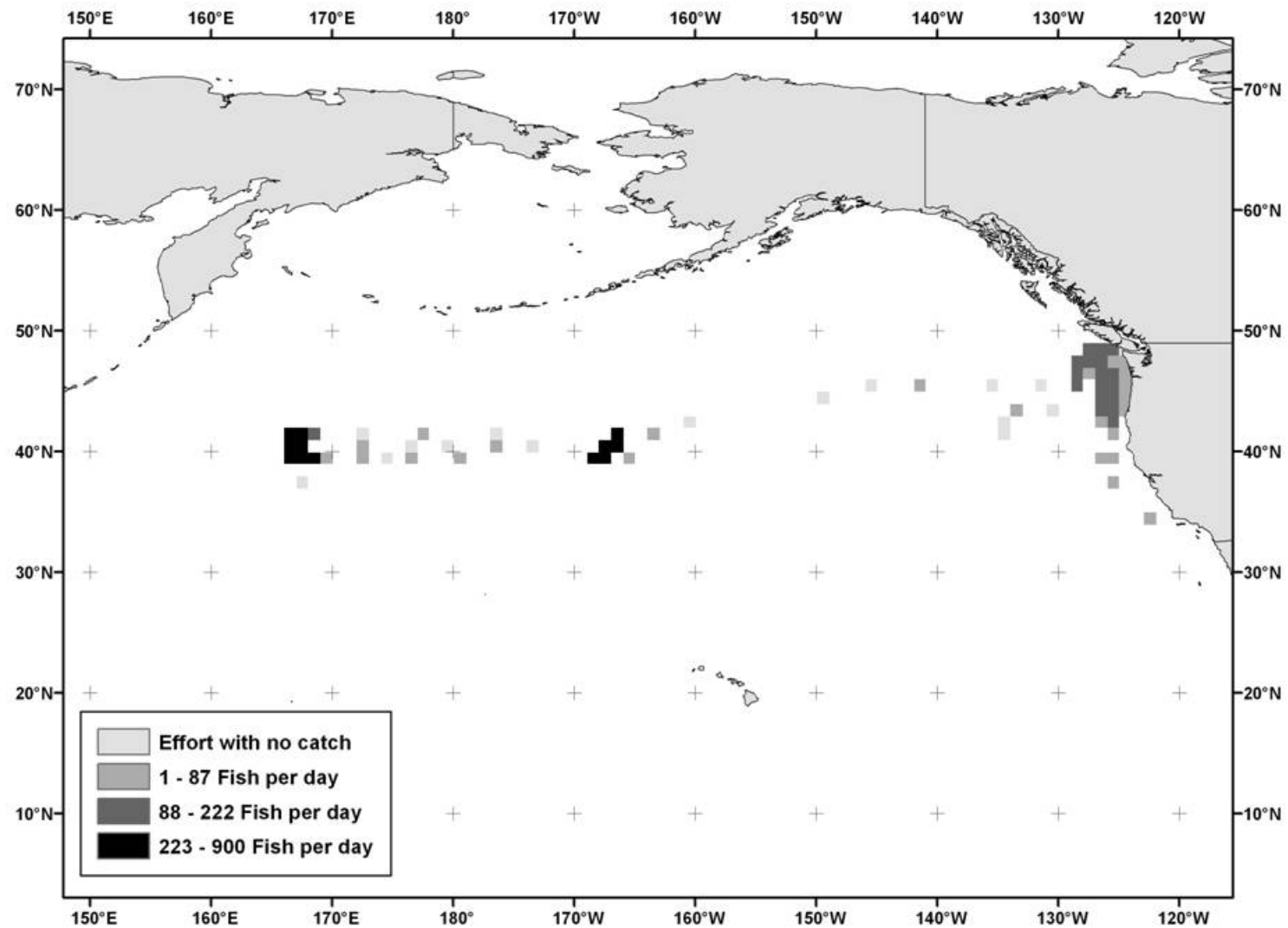
**Figure 5a.** Distribution of albacore CPUEs by U.S. troll vessels in the 2002 North Pacific season.



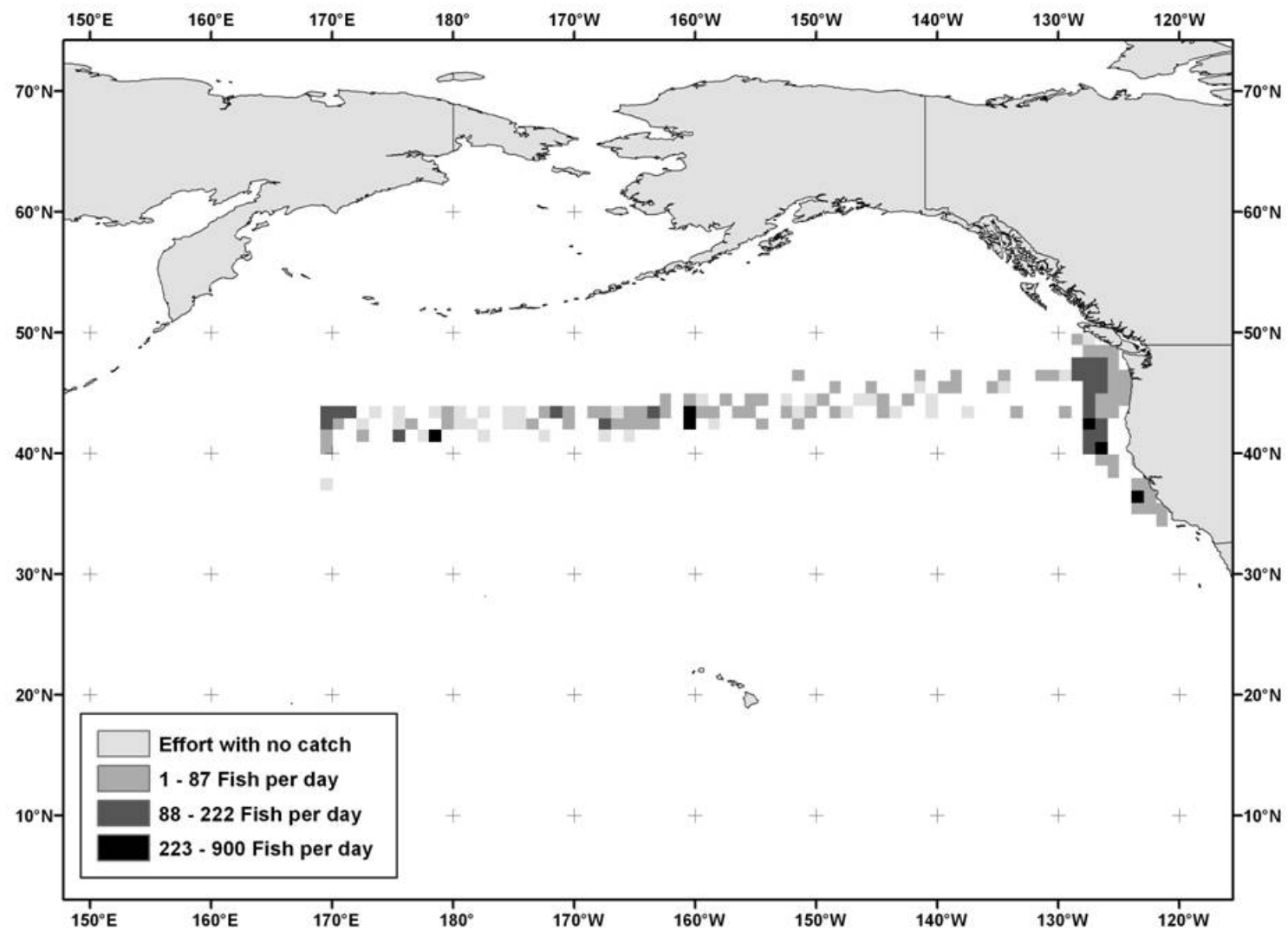
**Figure 5b.** Distribution of albacore CPUEs by U.S. troll vessels in May 2002.



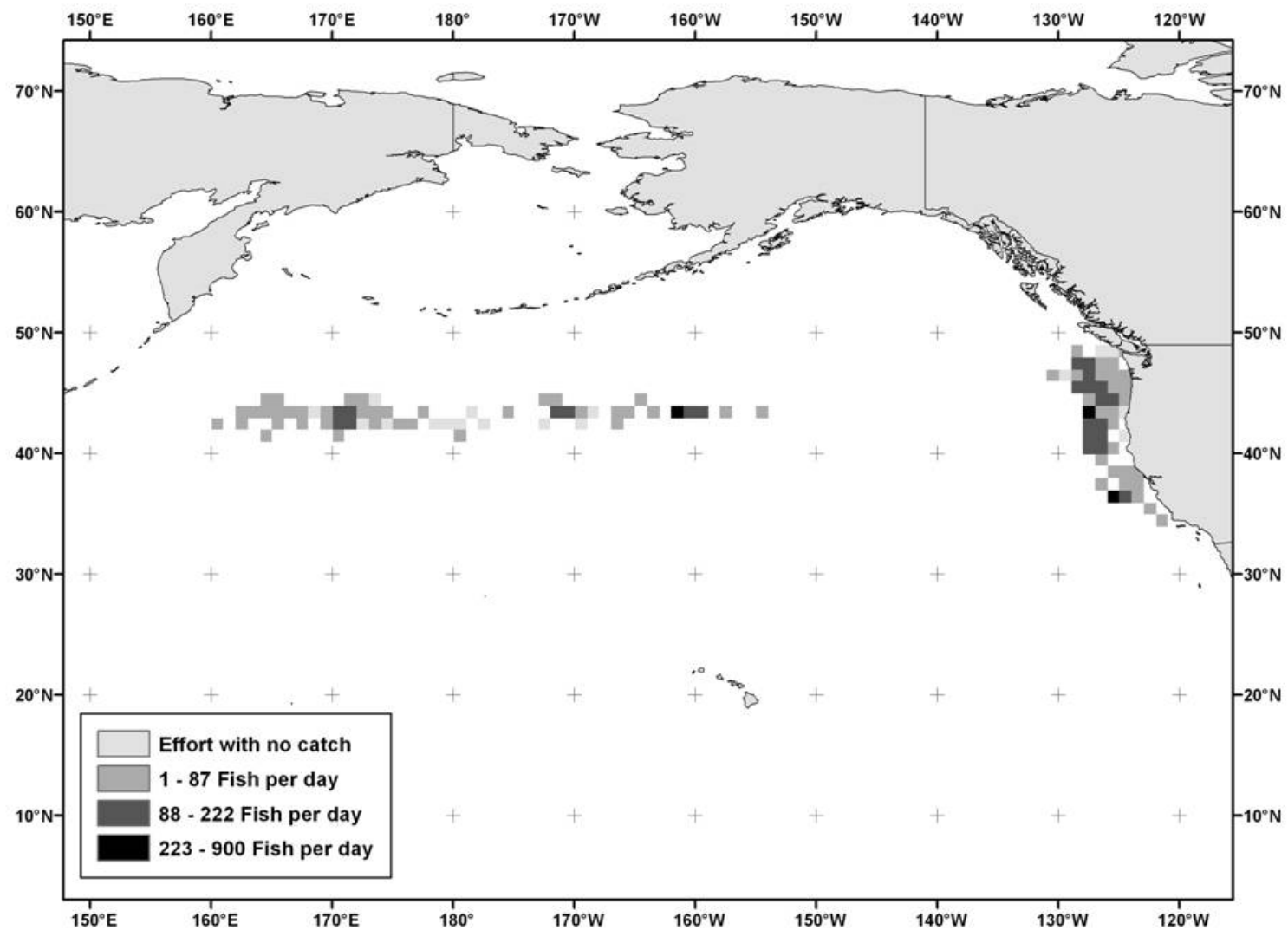
**Figure 5c.** Distribution of albacore CPUEs by U.S. troll vessels in June 2002.



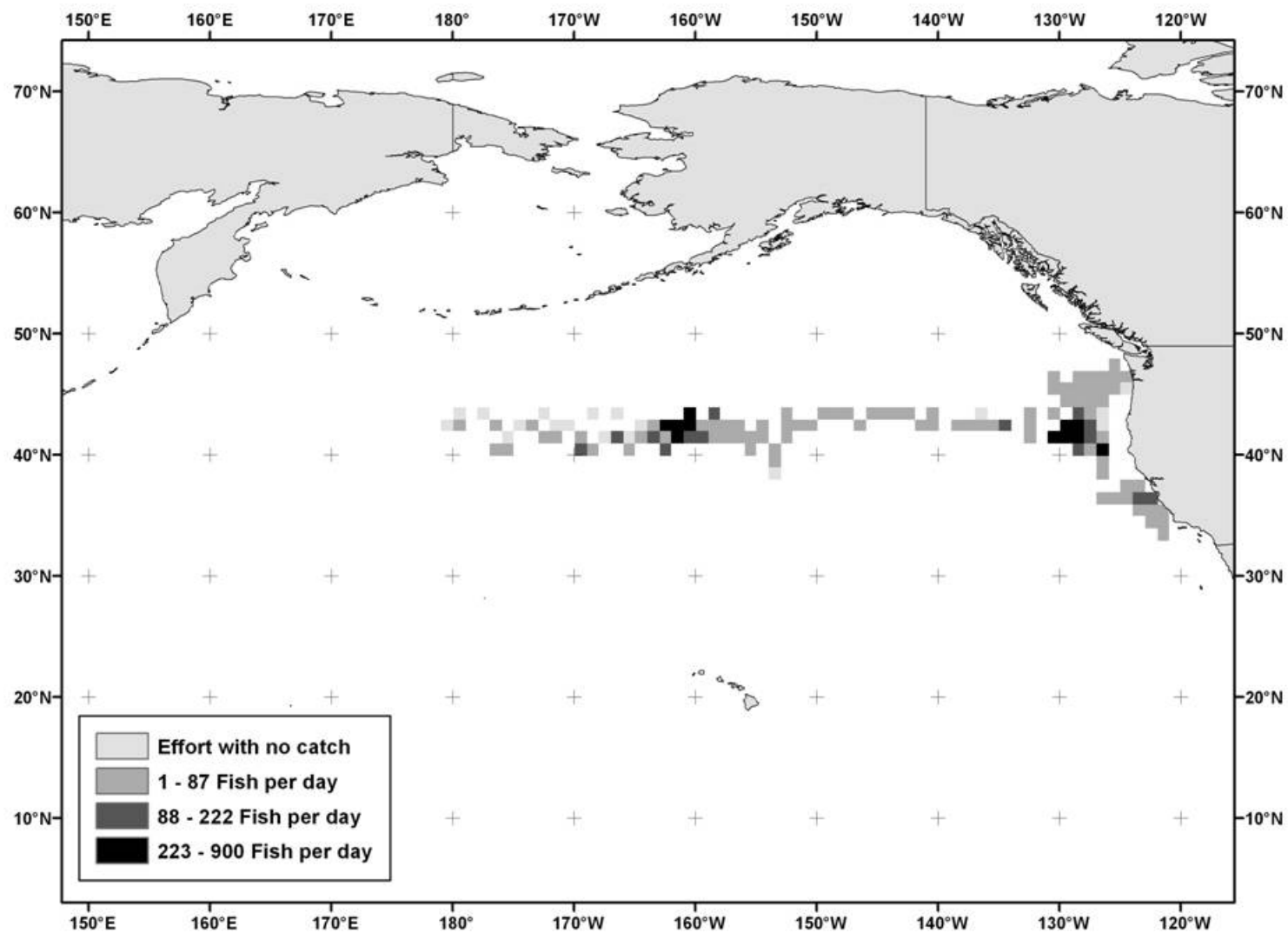
**Figure 5d.** Distribution of albacore CPUEs by U.S. troll vessels in July 2002.



**Figure 5e.** Distribution of albacore CPUEs by U.S. troll vessels in August 2002.

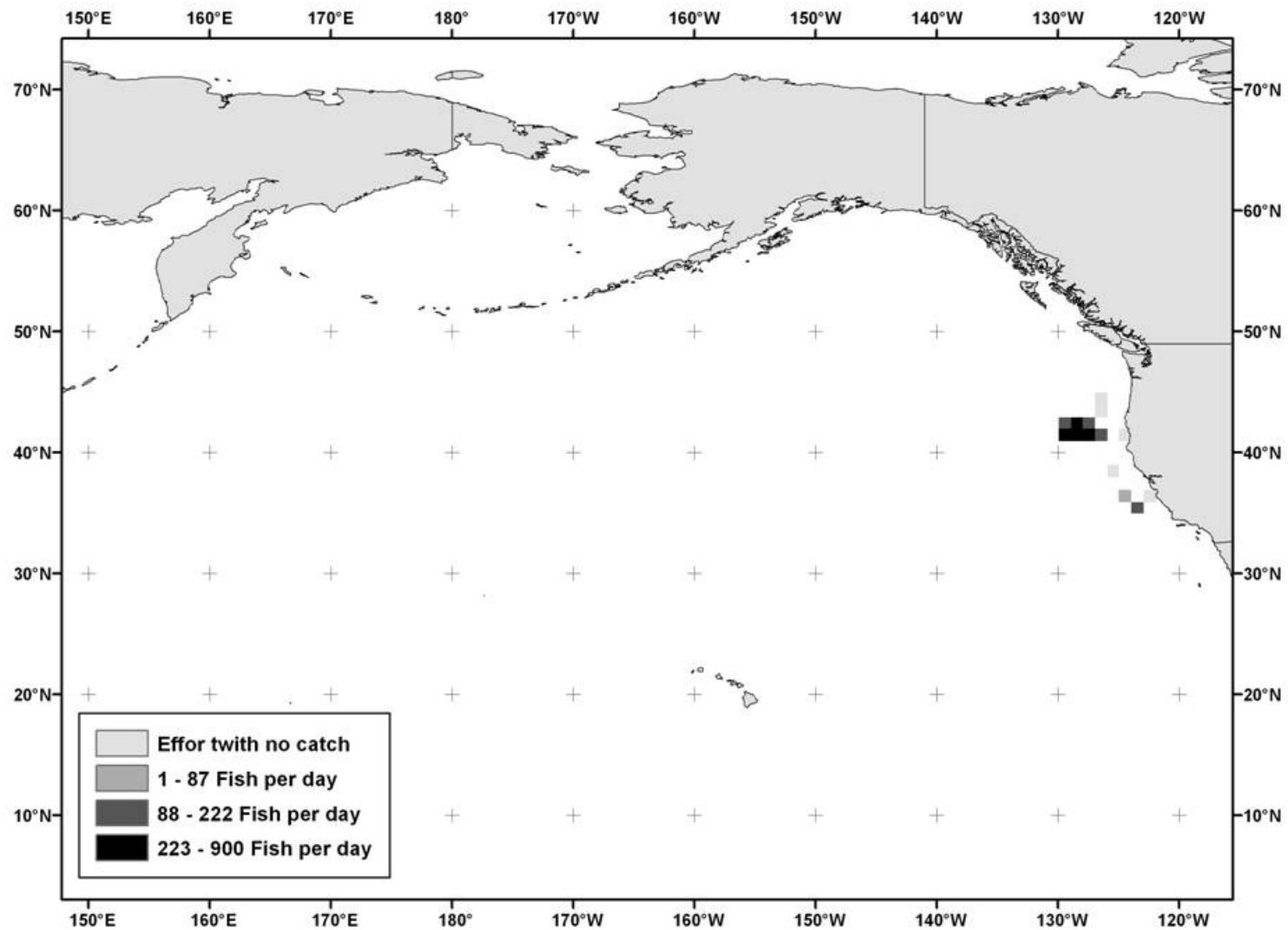


**Figure 5f.** Distribution of albacore CPUEs by U.S. troll vessels in September 2002.

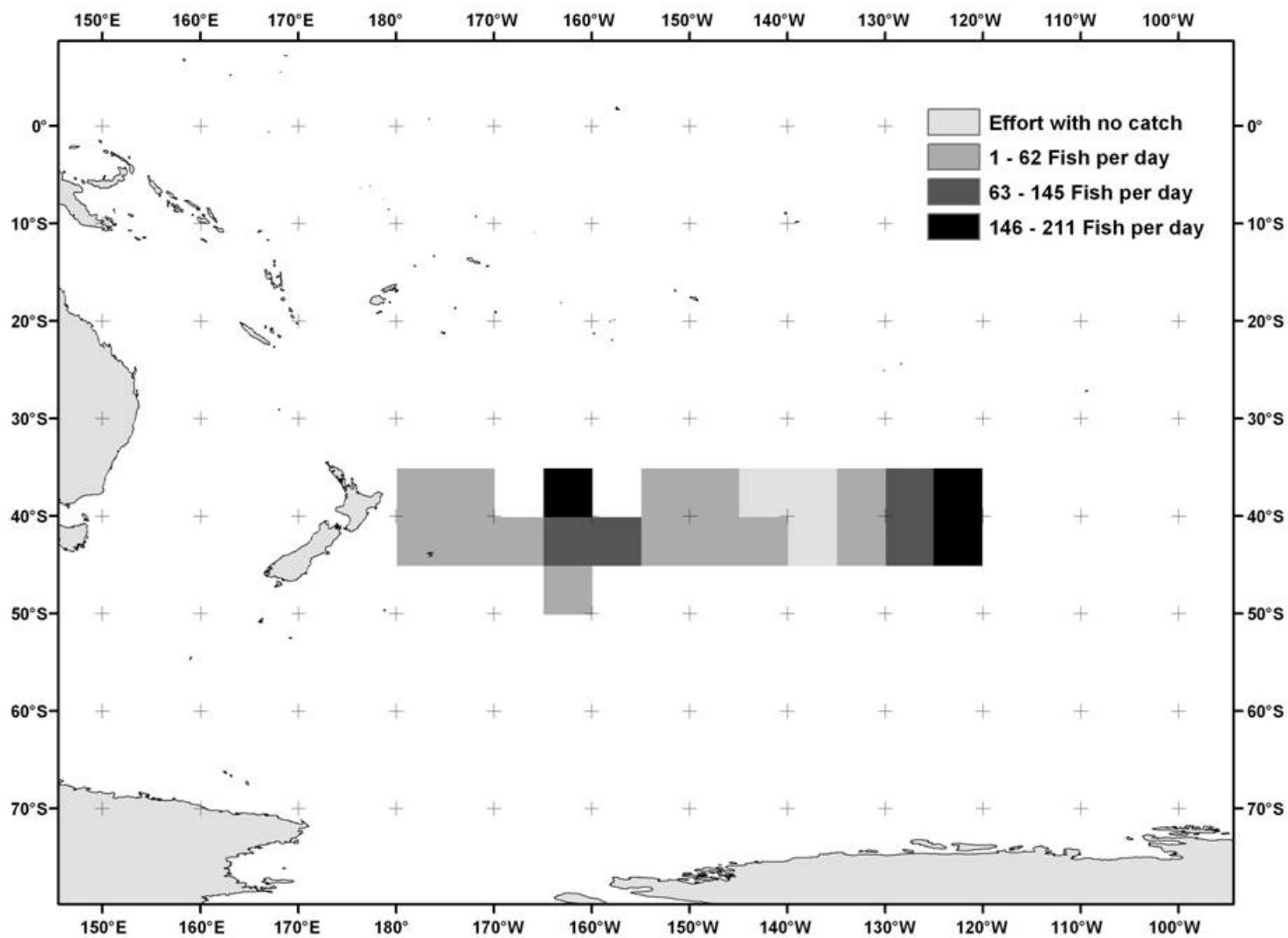


**Figure 5g.** Distribution of albacore CPUEs by U.S. troll vessels in October 2002.

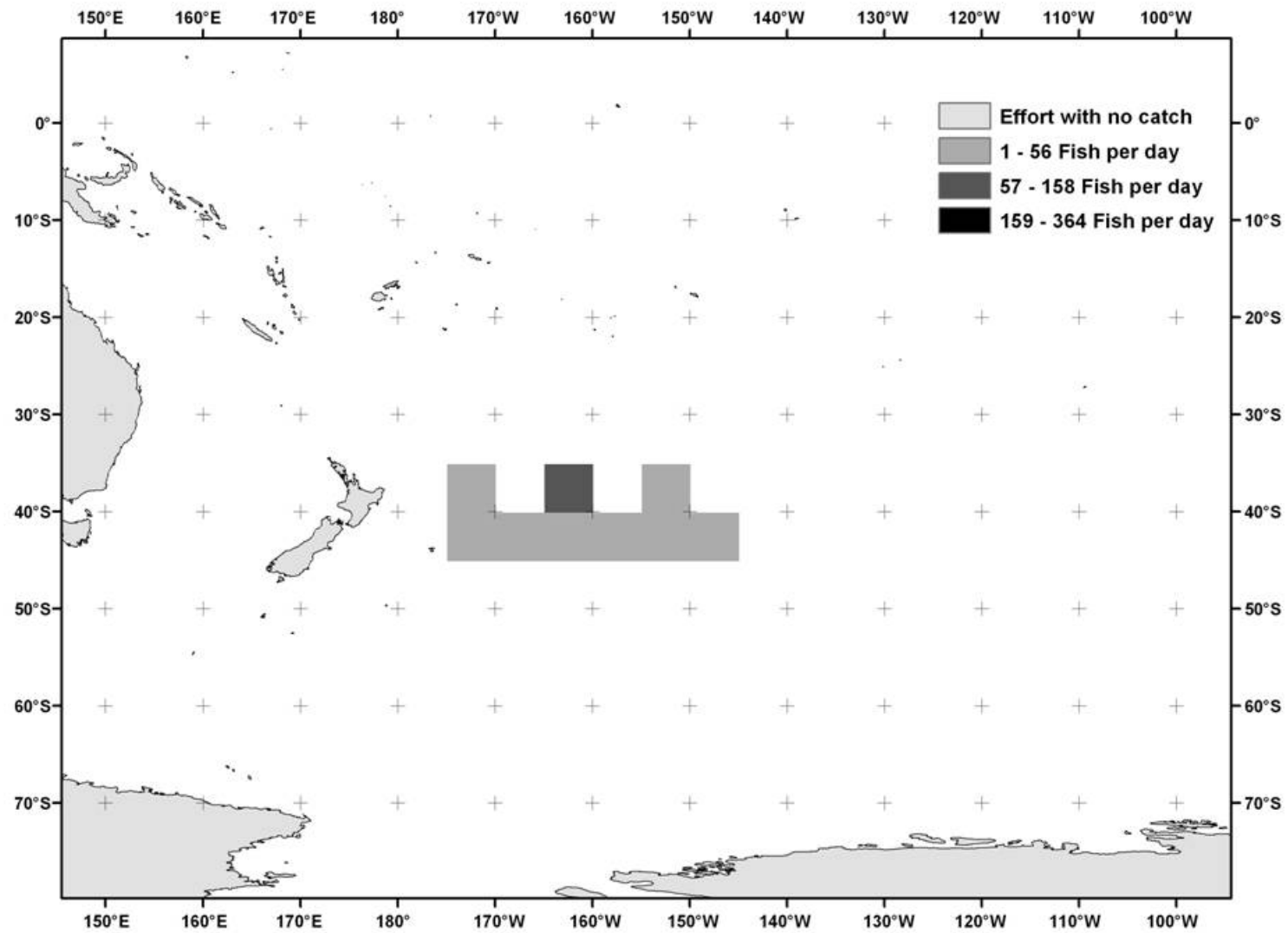




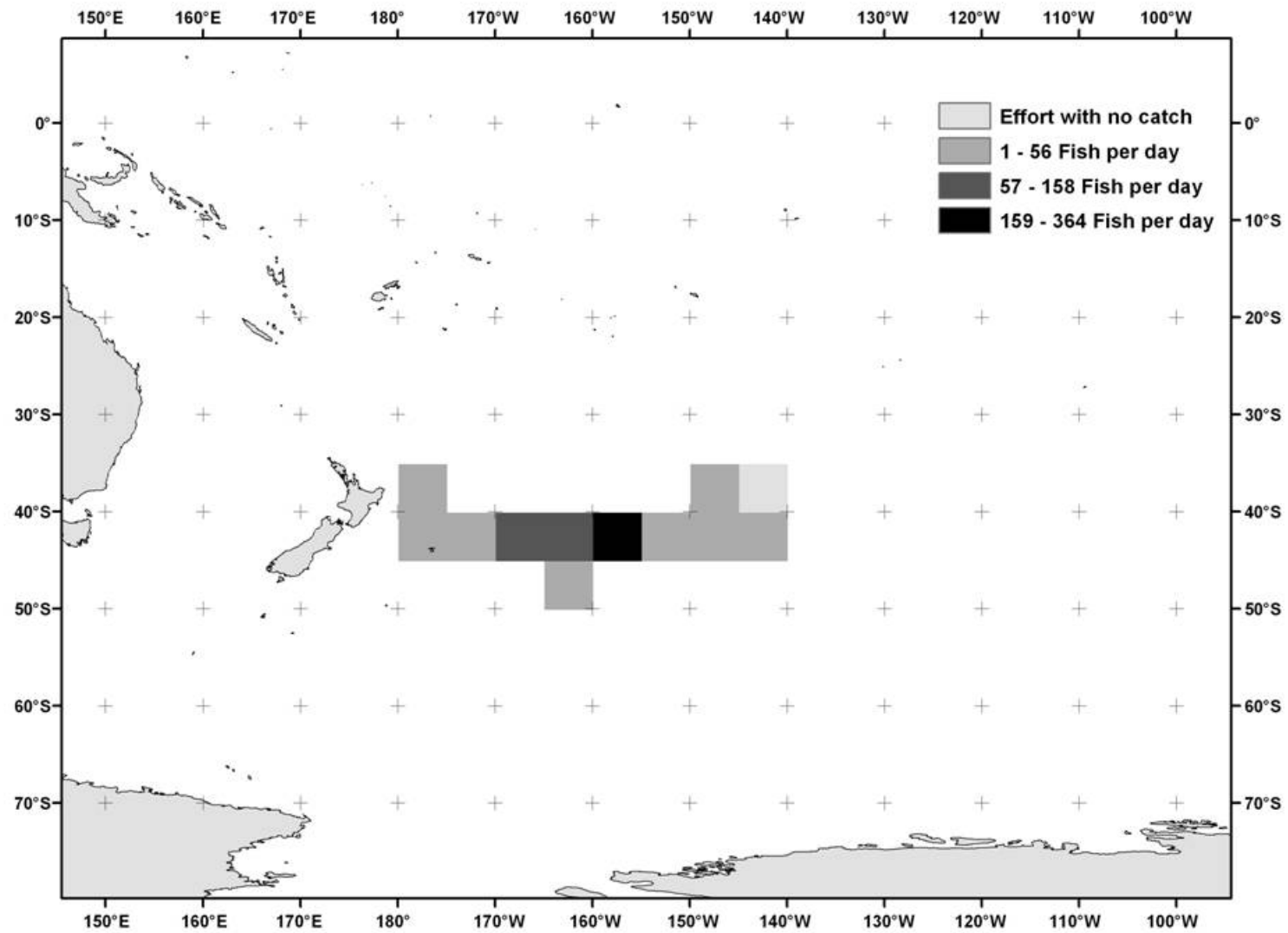
**Figure 5h.** Distribution of albacore CPUEs by U.S. troll vessels in November 2002.



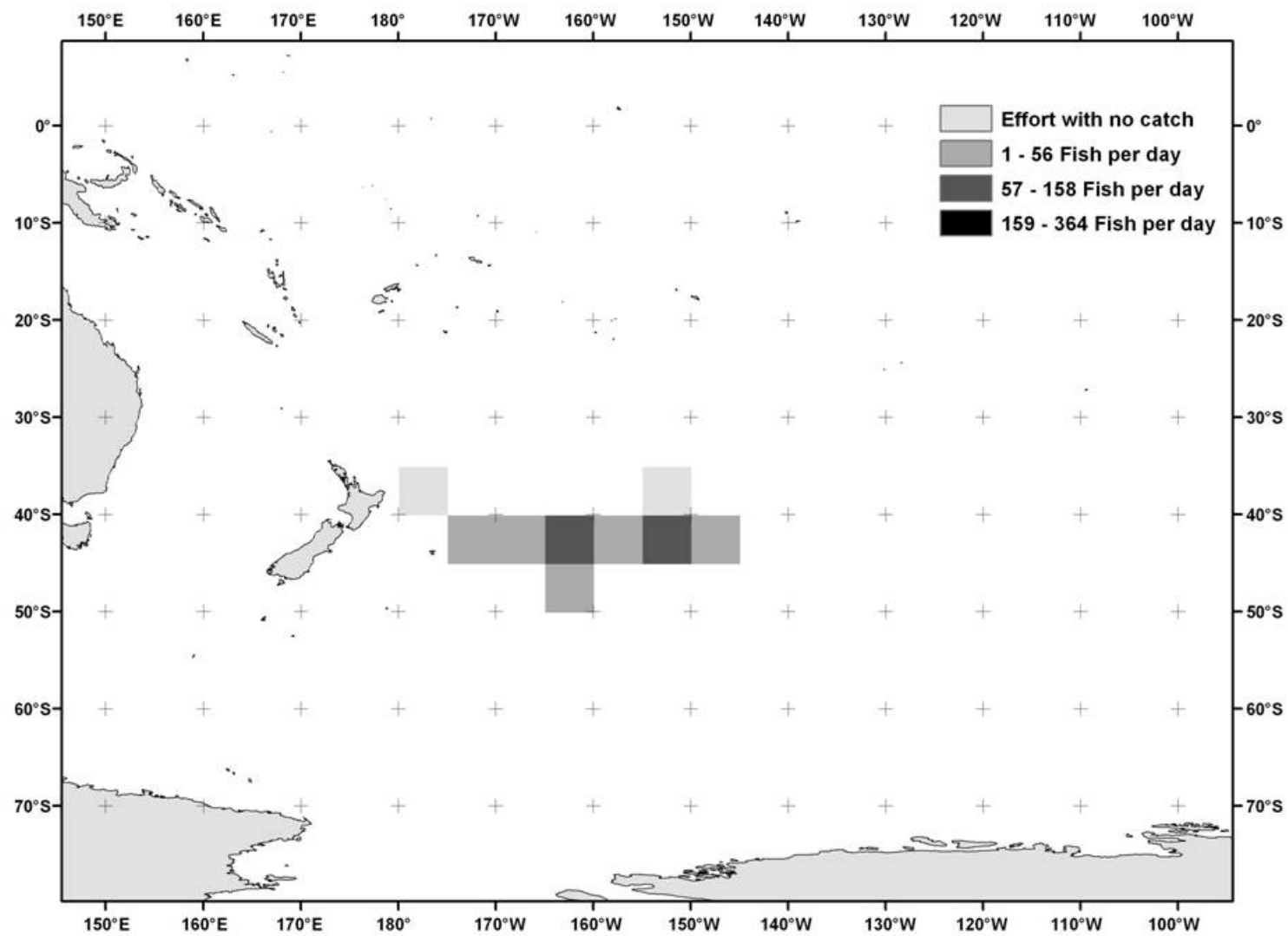
**Figure 6a.** Distribution of albacore CPUEs by U.S. troll vessels in the 2001-2002 South Pacific season.



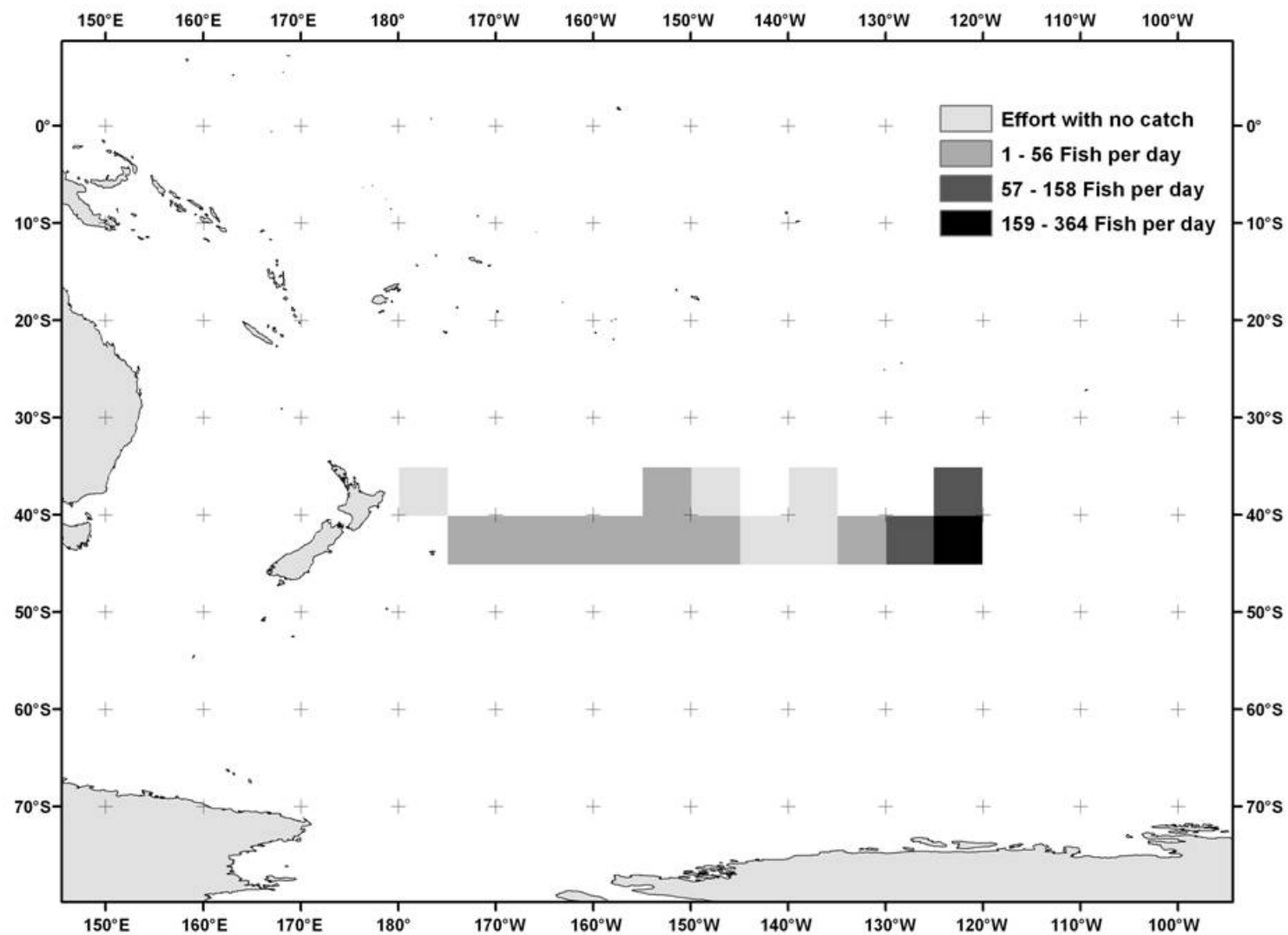
**Figure 6b.** Distribution of albacore CPUEs by U.S. troll vessels December 2001.



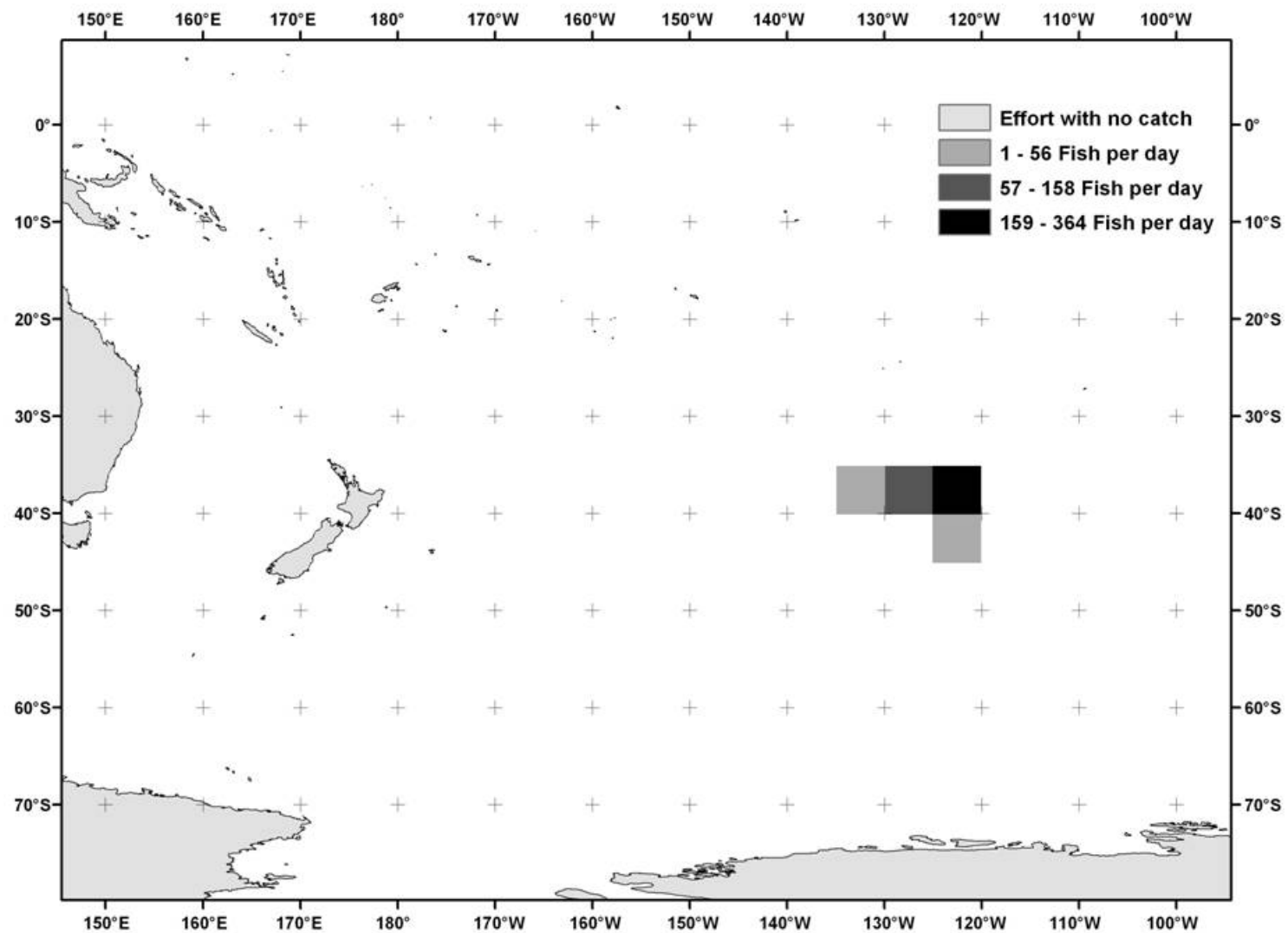
**Figure 6c.** Distribution of albacore CPUEs by U.S. troll vessels January 2002.



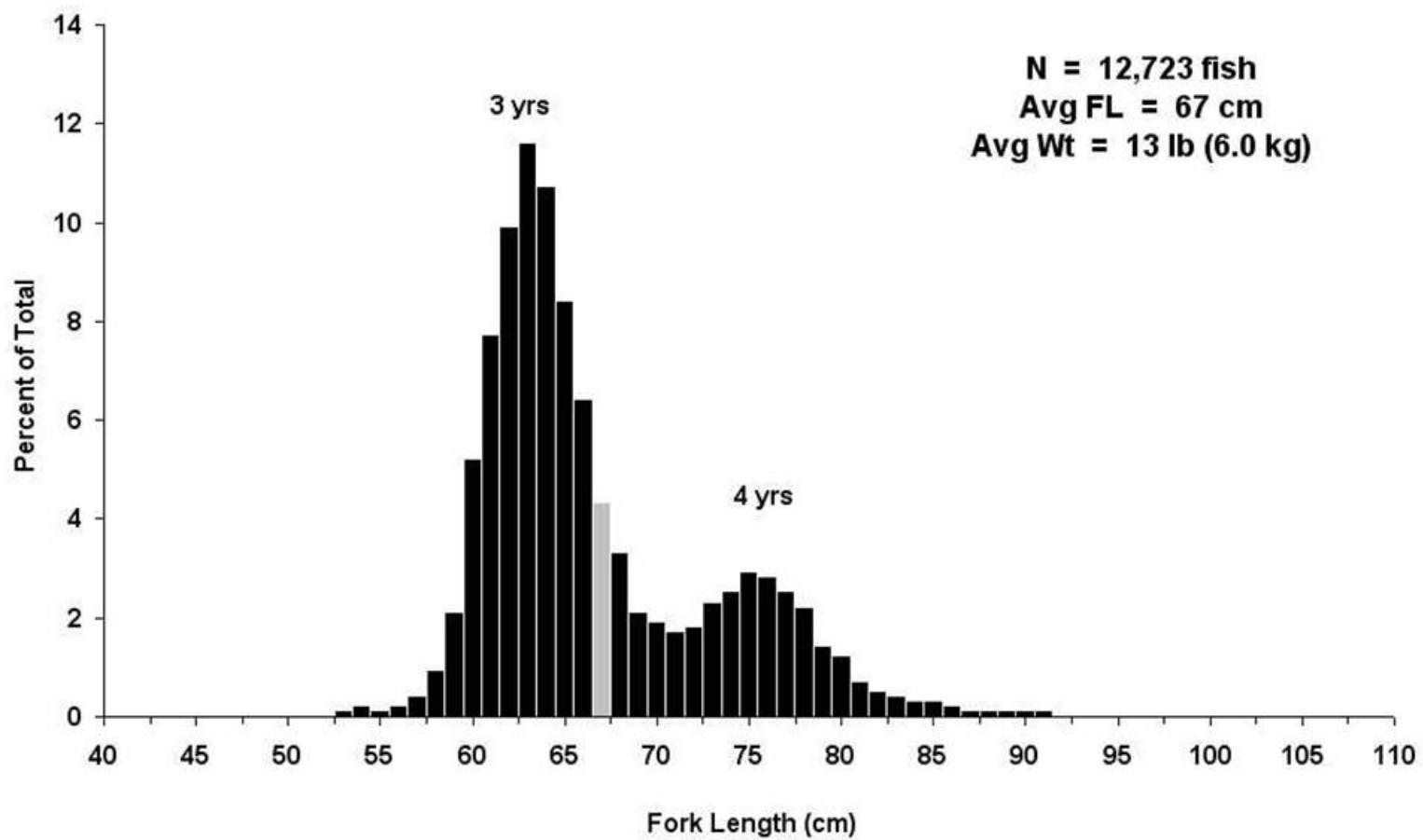
**Figure 6d.** Distribution of albacore CPUEs by U.S. troll vessels February 2002.



**Figure 6e.** Distribution of albacore CPUEs by U.S. troll vessels March 2002.

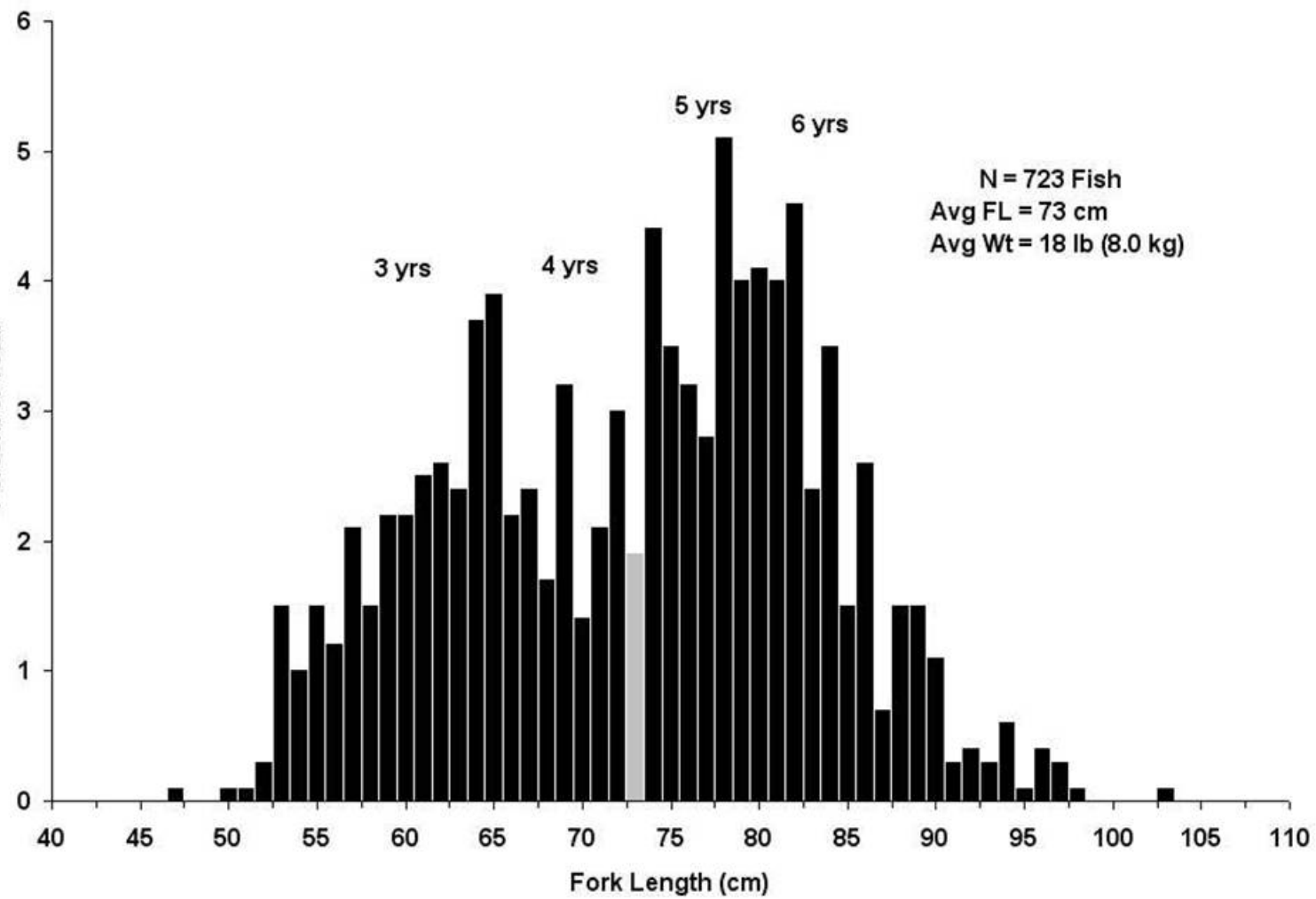


**Figure 6f.** Distribution of albacore CPUEs by U.S. troll vessels April 2002.



**Figure 7.** Length-frequency histogram of North Pacific albacore caught by U.S. troll vessels during the 2002 season.





**Figure 8.** Length-frequency histogram of South Pacific albacore caught by U.S. troll vessels during the 2001-2002 season.